

Adolescence

FORTY-THIRD YEARBOOK, PART I

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THE FORTY-THIRD YEARBOOK

OF THE
NATIONAL SOCIETY FOR THE STUDY
OF EDUCATION

PART I ADOLESCENCE

Prepared by the Society's Committee

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MARK A. MAY, and DANIEL A. PRESCOTT

Edited by
NELSON B. HENRY

Distributed by
THE DEPARTMENT OF EDUCATION, THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS

1944

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CHICAGO, ILLINOIS

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Published February, 1944
First Printing, 3,500

Printed in the United States of America

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1943-1944

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(Term of office expires March 1 of the year indicated)

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EDITOR'S PREFACE

This yearbook was first suggested by Dr. Harold E. Jones in August, 1939. Referring to the numerous studies of adolescent development recently completed or then in progress at such institutions as Harvard, Yale, Western Reserve, the Catholic University of America, the University of Chicago, and the University of California, and the related investigations growing out of the work of such agencies as the American Youth Commission and committees of the Progressive Education Association, Dr. Jones expressed the view that the time was rapidly approaching when a critical summary of the results of these projects could profitably be undertaken. He therefore proposed a yearbook on the subject of adolescence for publication in 1944.

The plan for this yearbook was considered by the Board of Directors at several meetings during the ensuing two years. The various suggestions offered in the course of these discussions were submitted to Dr. Jones in several conferences in which Deans Freeman and Kefauver represented the Board. At the San Francisco meeting in February, 1942, Dr. Jones presented the revised outline for the yearbook which was approved. The committee responsible for the preparation of the yearbook was then appointed and an appropriation for committee expenses was set up.

The yearbook not only provides a valuable summary of the results of studies of individual development based on the techniques of investigation in the fields of physiology, physical measurement, psychology and sociology, but also explains the interrelationships involved in the findings of such segmental studies and interprets the role of specific aspects of growth in the educational and social adjustments with which the individual is confronted in the crucial period between childhood and maturity. The timeliness and serviceability of the volume are aptly denoted by Dr. Stoddard, who, at the request of the committee, wrote the evaluation of the yearbook which appears as the concluding chapter, and therein expresses "the opinion that, for a long time, we shall not need another yearbook based on the same type of material. It will be better to wait," he explains, "until new methods of analysis (physiological, mental, emotional, and social) have been perfected."

NELSON B. HENRY

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CHAPTER I

INTRODUCTION: ADOLESCENCE AS A PERIOD OF TRANSITION

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I. THE ADOLESCENT AND THE SOCIAL ORDER

Adolescence is both a biological process and a social-cultural transition. The juvenile organism undergoes a process of growth and maturation as it moves toward adult size and functional capacity, and, more or less concurrently, the individual must pass through a transition from the status and conduct of a child to the responsibilities of the adult. The suitable adjustment of these processes, each to the other, and the appropriate direction and timing of the demands made by adults upon the developing adolescent are important factors in the ease and adequacy of growing up in our culture.

With a better understanding of the organic growth and maturation of boys and girls during the second decade, and with more insight into their personality development and social adjustment, we may hope to control some of the sources of pressure and strain which now constitute hazards of major or minor import in the lives of many adolescents. As will be seen in this volume, we already have considerable knowledge of the biological process and some understanding of the social growth of the individual which we can and should utilize in our homes, schools, and community programs.

While much of the basic culturization of the individual takes place in the early years, it is obvious that important phases occur during the second decade when he is being inducted into adult living and being trained to take his place as an active participant in the group life.

It is worth while to reiterate here the familiar statement that the human child has the longest infancy of all species; and to add that human adolescence is also significantly prolonged. This prolonging of the maturizing process during both childhood and adolescence has

immense significance for both the individual and society. During these years of growth and development, the child remains more or less plastic, capable of the learning and adaptation which are necessary for social living. As pointed out by various writers, man has made his adaptations, not by organic differentiation, but by developing the attitudes, ideas and tools we call culture, which each generation must learn anew from its predecessors. Through this repeated learning, with continuous modifications in what is learned, society has maintained its ability to evolve new social and cultural forms.

Here it should be recalled that if we have social order it is because the patterns of action, speech, and belief necessary to group life are transmitted to the child and adolescent by adults in accordance with the traditions they cherish. What they teach the child and the adolescent, the demands they make upon them, the prohibitions they lay upon them, the privileges they accord them, and the time at which these occur are among the factors which reflect and maintain the social order.

II. GROWTH PATTERNS IN ADOLESCENCE

It has become increasingly evident that the growth and development of the child is a more or less orderly sequence or process which, for convenience, we classify into various arbitrary steps or periods. It is also clear that each individual child moves through this sequence at his or her own rate of progress and attains dimensions of structure, function, and behavior that are idiomatic to the individual. Thus, while we observe a certain order and regularity of process, we may also note a wide diversity of products, as exhibited by groups of individuals who differ in size, shape, and capacity, although of the same chronological age. As a result of these pronounced differences in rates of growth and maturation, the number of years a person has lived is in many situations of less significance than the level of physiological and social maturity he has attained.

Differences in the time of maturing are sometimes of great importance to the individual. The early-maturing child has a shorter period of prepuberal development than the late-maturing child. Conversely, the child with early puberty may have a prolonged period in which to make adolescent social adjustments, while the late maturing may have to compress these adjustments into a shorter interval before reaching adulthood. Preceding and accompanying sexual maturation the child undergoes a transformation in size and body form of greater or less degree, with a lengthening of the legs that sometimes produces

an almost sudden change in height. Some rapidly growing boys and girls may "shoot up" and within a brief period of eighteen months or two years attain nearly their full adult stature. Others may grow slowly but continuously over a longer period.

It has become evident that puberty is merely an early stage in adolescent development. It may be two or three years after the first menstruation before the girls will ovulate and attain full sex maturation and the capacity for procreation. Less is known about the male, and at present it is not possible to say when spermatogenesis or production of motile, functionally potent sperm does occur.

At this point we should also note that recent studies show that every individual is bi-sexual, with the power of producing both male and female sex hormones. These male and female hormones have been found in the urine of boys and girls as early as five or six years of age; they increase in quantity as children approach puberty. Initially, the female sex hormones (estrogens) are more significant for puberal development even in the male, who develops only somewhat later a characteristic preponderance of male hormones (androgens). This balance of male and female hormones directs or controls the sex maturation of the boy and girl and the appearance of the secondary sex characteristics—breasts, pubic and axillary hair, beard, voice changes, etc.

One important aspect of adolescent development is that the growth of other dimensions and of the several organ systems may lag behind growth in stature. (See chapter v for a discussion of cases of "asynchronous" development in adolescence.) The very tall boy of fifteen or sixteen may still have juvenile, undeveloped gonads, while his heart and circulatory system, the respiratory system, and the gastrointestinal tract may still be relatively immature and progressing only slowly toward the size and functional capacity appropriate to his stature. Conversely, the boy or girl who reaches puberty at an earlier age apparently grows and develops more as a whole, with fewer biological discrepancies and organic imbalances. But this earlier puberty has its disadvantages as well as advantages, especially in view of the social consequences of "outgrowing" former friends and associates.

A simple analogy may serve to illustrate this. We can imagine a hundred boys and a hundred girls starting from New York to California. A small number of them will travel by airplane, arriving there quickly. Another and larger group will travel by fast limited express trains and arrive soon after the first group. A still larger group will travel by trains operating on the usual time-schedules

some will go by bus, others by hitch-hiking, and a very few will attempt to trudge across the continent on foot. Not all of the two hundred will reach their destination, for some will be lost en route. Those who do arrive will bear the evidence of how they traveled—including the discomforts and dangers of each mode of travel.

Similarly, in the course of child development, each mode of travel, each pattern of growth and maturation, involves its peculiar biological and personality risks. Just because the whole organism is changing, in organ systems and functions as well as in external size and shape, an impairment often occurs in the ability to maintain homeostasis, or physiological stability. Especially during the period when various parts of the organism are showing their maximum discrepancies in rates of growth, we may find that some functional activities are imperfectly integrated. If these interacting functions become seriously out of balance, as may sometimes happen as a result of neglect, overstrain, inadequate nutrition, or other adverse factors, it is possible that the residual effects of this adolescent disturbance will be carried over to influence, when they emerge, the physiological patterns and homeostatic capacity of the adult.

Boys or girls who complete their growth within a relatively short time may experience only a brief period of instability and may therefore be able to go forward to adult status with less internal incongruity. On the other hand, a brief (and therefore exceptionally rapid) period of growth may entail disturbances of various kinds merely because of the sudden, unexpected increase in size. During this brief period the adolescent must revise his image of the body and try to become accustomed to a new body size and form. Moreover, many of the eye-hand co-ordinations and other patterns of muscular co-ordination built up over the years of childhood may be rendered obsolete by these changes, so that the individual may find himself clumsy and painfully incapable of even simple activities.

III. SOCIAL DEMANDS UPON ADOLESCENTS

In general it may be said that the adolescent must face an altered body and the necessity for revising his body image and habitual motor patterns; and he must learn to adapt to a world in which people and situations are changed and in which he must play new and different roles. With puberty comes also a profound internal change, involving novel impulses and feelings and more sensitized social reactions. Almost suddenly the individual becomes aware of the peculiar characteristics of the members of the opposite sex and consciously regards them as

the focus of his or her own interests and as the source of possible embarrassments or even dangers. These changes occur in the individual with greater or less rapidity and carry significance according to the rate and magnitude of the alterations and according to the individual's own past history.

It has been repeatedly said that the adolescent is a source of perplexity and irritation for adults—his parents and teachers especially—but less frequently has it been noted that the adolescent may be equally a problem to himself. That such is often the case is shown by the common picture of the adolescent, especially of the rapidly growing boy, who may be physically present in a room or class but so pre-occupied with his own reveries that he is seemingly incapable of coming to a focus upon anything. This condition may be indicative of the confusion and the often acute anxiety some adolescents face. Pressed both internally and externally and trying to meet the demands placed on them by families, schools, and other adolescents, they sometimes find it necessary to conform, at one and the same time, to the requirements of several different levels of maturity.

What happens to some adolescents today is indicated by the death rate and the incidence of mental disorder during the second decade of life. In this country the period from ten to fifteen years of age has the lowest death rate of all age periods from infancy to senility. But in the age period fifteen to nineteen boys and girls begin to succumb to the stresses and strains of later adolescent life, and the death rate increases nearly 100 per cent. The deaths from accidents are highest, while tuberculosis, diseases of the heart, pneumonia-influenza, and appendicitis are next in order of magnitude. Thus, in the period when individuals should be biologically most resistant and strong, they are dying prematurely at a rate which is to be deplored.

Likewise for mental disorders. In the age period ten to fourteen the first admissions to state hospitals for mental disorders is very low—in New York State only 4.3 per 100,000 children of that age. In the age period fifteen to nineteen the rate is 40.3 per 100,000, almost a ten-fold increase over the preceding five-year period. Moreover, during adolescence a number, not definitely known but significantly large, suffer what is known as "nervous breakdown," while others commit suicide or attempt to do so, become delinquents, vagrants, "bums," or homosexuals, or waste their lives in alcoholism, drug addiction, or in various neurotic patterns leading to self-defeat and tragedy for themselves and their families. Some of these unfortunate outcomes occur among the most promising youth, the highly intelligent and

gifted, whose perplexities and personality difficulties are often too long ignored.

Here we should bring into question the old belief that health and sanity are primary qualities which in the physically or mentally ill are somehow mysteriously "lost." Rather we should think of health and sanity as conditions which each individual must *achieve* by meeting the demands of maturation and attacking the persistent tasks of life with adequacy and courage. How fully these conditions will be achieved will depend in part upon his own characteristics as a unique personality, and in part upon the aid or obstruction that he receives from his family, his school, and other adult agencies. It should be recognized that while all adolescents in our society are confronted with somewhat similar problems of transition into adulthood, many mature with little or no acute emotional disturbance and with a more or less well-harmonized pattern of growth, so that they are not subject, in any serious degree, to the physiological imbalances or to the crises of readjustment just described.

We cannot emphasize too strongly, however, that the life tasks which our culture presents to the maturing child can be neither ignored nor evaded. Each child must in some manner adjust to the role of being a man or a woman; must attempt to emerge from the status of an obedient, dependent child to that of a responsible, self-directing adult member of society; and finally must come to terms with the contemporary social life and meet the various requirements and expectations of both his age group and older adults.

In these years of transition from childhood, in which he has been primarily an object of culturization by adults, to the conditions and responsibilities of adult living, the adolescent becomes a carrier and interpreter of the traditions and aspirations of our culture. As the adolescent goes on to adult living, becoming a husband or wife, a father or mother, a worker and a citizen, he or she not only takes a place in the maintenance of social order but also may influence the subsequent course of that social order. It is especially important to recall that the adolescent, during this period of adjustment to adult life, may project ahead some more or less clearly conceived ideals of self and also of society. In these hopes, expectations, and anxieties of the adolescent period, and more specifically in the image that each individual forms for himself and the aspirations that he cherishes for human welfare, may be found a strategic means for social change.

No one who reflects upon urgent needs of youth and their significance for society as a whole can fail to be impressed by the neces-

sity of maintaining an educational program which will genuinely help them to grow up and find a design for adult living. It is not unwarranted to say that at present we are unnecessarily and callously wasting some of our most valuable human resources by failing to meet the needs of youth more adequately during these adolescent years.¹

This wastage will become more serious as the number of adolescents declines. It is expected that by 1950 there will be at least 2,000,000 fewer boys and girls in the second decade of life than in 1940—an absolute decrease in this age group for the first time in our history. Moreover, the decrease will continue because the proportion of young children in our population is less today than ever before, and it may be assumed that the large number of babies born during the war period will probably be only an isolated group who will swell the number of children and adolescents only for a few years, like a solitary high wave as the tide goes out.

What the dictators have done with their adolescents is both a warning of what neglect of this group may entail and also a confirmation of the belief that adolescents are the strategic group for social change. It must be admitted that our procedures in dealing with youth frequently aggravate their difficulties and intensify their deviations and defeats. It sometimes seems as if the schools on one side and the family on the other were determined to frustrate adolescents—not so much from any conscious desire to block them or hurt them, but rather from lack of understanding and insight and from inability to recognize in the growing boy and girl the emerging young man and young woman.

¹“Adolescence,” *Human Conservation: The Story of Our Wasted Resources*, chap. vi. Publication of the National Resources Planning Board, March, 1943. Washington: Government Printing Office, 1943.

SECTION I

PHYSICAL AND PHYSIOLOGICAL CHANGES IN ADOLESCENCE

CHAPTER II

PHYSICAL CHANGES IN ADOLESCENCE

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The normal human life span may be considered as divisible roughly into three epochs: the first, which extends from conception until past the age of twenty, is the time required to attain adulthood; the second is the variable, but usually very brief, period during which the individual enjoys the peak of his physical efficiency; and the third is the period of physical deterioration, a process which begins insidiously as early as the late twenties and, gathering speed as the years go by, effects his eventual senility and dissolution. Thus, the first twenty-odd years of life are spent in achieving physical maturity and a degree of physiologic equilibrium which is lost, at least in part, almost as soon as it is attained. If this seems an exaggerated statement, one need only recall that the baseball player is usually past the peak of his physical efficiency at thirty and that the pugilist's legs have already begun to slow him down some years earlier. Viewed in this way, it is, perhaps, not too much to say that man has scarcely begun to live when he begins to die.

We need not dwell longer on this morbid note, nor need it unduly distress us; for, after all, there are still some pleasures left in life after most of the agility of youth has been lost. This concept is presented here merely because it serves to put into a somewhat clearer perspective the period of life, adolescence, with which this volume concerns itself.

Adolescence begins early in the second decade and is usually considered as ending at about the twenty-second or twenty-third year in boys and somewhat earlier in girls. It covers, therefore, approximately

the last ten years of what was just referred to as the first epoch of life, the period extending from conception to adulthood.

The physical changes which occur during this early period of life include both growth and development: growth, in the sense of an increase in mass, volume, and external dimensions, and development, in the sense of becoming progressively more complex. These two processes, growth and development, do not proceed at the same absolute rate or at the same relative rate throughout this early period of life. There are intervals during which the body is increasing in size more rapidly than it is growing in complexity, and there are other times at which this relationship is reversed. Some of the developmental changes which occur during adolescence are, perhaps, best appreciated when viewed in the light of some events which have preceded them. Let us, therefore, consider briefly some of the more conspicuous physical changes which have occurred in the child by the time adolescence begins.

When we speak of things which are determined by heredity in the human body, such traits as eye color, hair color, hair form, skin color, or such defects as hemophilia, red-green color blindness, etc., suggest themselves. We are likely to lose sight of the fact that, in addition to determining a vast number of what may more or less properly be called "unit characters" such as those which were just enumerated, there is also in the germ plasm some mechanism which controls larger aspects of development and which insures, for example, that human beings give rise only to other human beings and that elephants continue to produce only elephants.

The genetic constitution of man, like that of other forms, controls another important aspect of development. It not only determines within rather narrow limits what the end product of development will be, but it also prescribes quite definitely the stages to be followed in attaining that end. One expression of such genetic control is seen in the human growth pattern, a consideration of which will return us to the principal theme of this chapter.

I. GROWTH IN PHYSICAL DIMENSIONS:

HEIGHT AND WEIGHT

Most of the existing information on the human growth pattern is based on what has been termed "cross-sectional" data, which take the form of average heights and average weights of boys and girls of various chronologic ages. Such values are usually obtained in this way: An investigator measures and weighs a reasonably large number of

boys and girls of say, one year of age, and determines the average height for each sex. He then measures and weighs an approximately equal number of boys and girls of two years of age and determines the corresponding average values for them. The same procedure is used for other age groups, and the investigator eventually emerges with figures, which, when translated into tables and graphs, are very impressive and are rather generally accepted as a faithful delineation

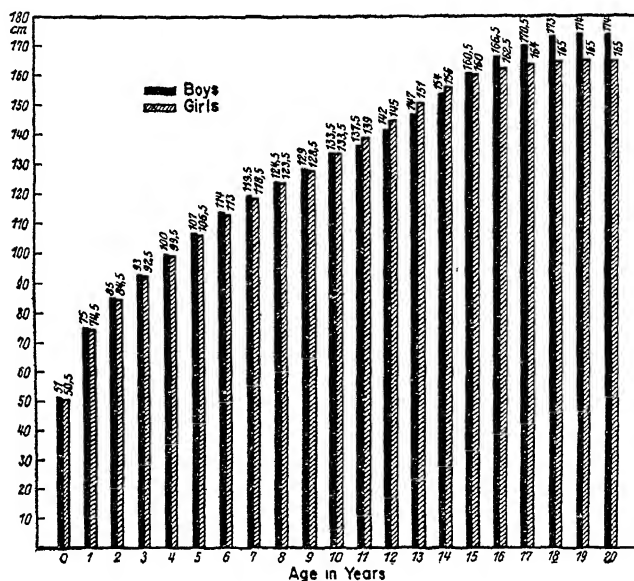


FIG. 1.—Growth in stature. (After Pfuhl.)

of the human growth pattern. Data of this kind have proved to be of considerable practical value. They suffer, however, from certain inherent disadvantages; and attention will be called to some of those disadvantages as we proceed. Let us consider, first, an example of the pattern of human growth which is based on such cross-sectional data.

Figure 1 shows graphically the average standing heights of boys and girls for each year from birth to twenty years of age. The average heights of the boys are shown in solid black, while those of the girls are represented by cross-hatching. This figure is taken from Pfuhl's study of South German children (21). The writer has chosen these European data rather than comparable data from this country because they are based on a somewhat more homogeneous population than our own. The observed average standing heights for the boys and for the girls

are recorded separately for each age group. It will be noted that, in this study, the boys are somewhat taller (longer) than girls at birth and that they maintain this superiority up to about the age of ten years, at which time the girls equal the boys in stature. From the ages of eleven to fourteen years the girls are taller than the boys, but by the age of fifteen years the boys have grown slightly taller than the girls. The boys' superiority in stature increases during the next four years and is maintained thereafter.

Figure 2, from the same source, shows the average weight in kilograms of the same group of boys and girls from birth to twenty years

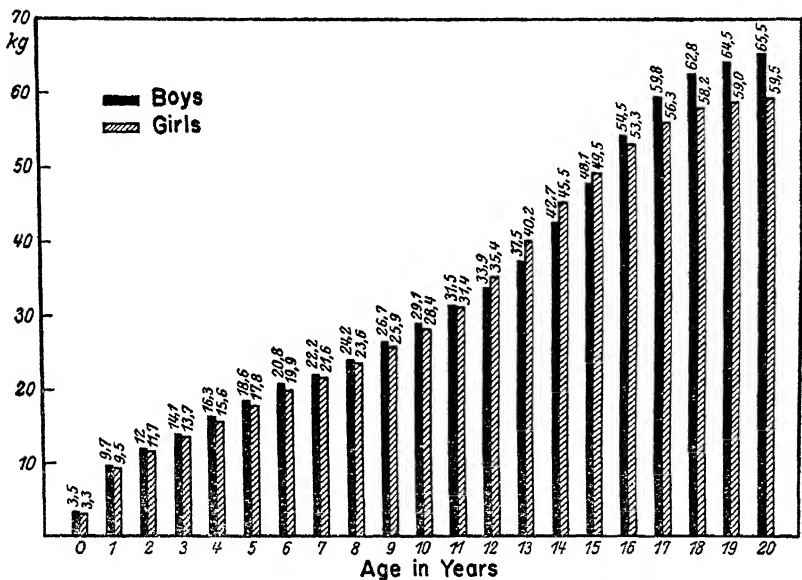


FIG. 2.—Growth in body weight. (After Pfuhl.)

of age. It will be noted that whereas at eleven years of age the average height of girls is about 1.5 cm. greater than that of the boys, the boys remain during this year slightly heavier than the girls. The reverse is true at the age of fifteen years, at which time the boys again exceed the girls in height, but have not yet regained their superiority in weight.

The pattern of growth is shown somewhat more clearly in Figure 3, in which the average annual increments in height and weight, rather than the absolute heights and the absolute weights, are represented graphically. Average heights and average weights alone, of course, give no information about the range of variability of these two aspects of

growth in the group from which the data were derived. Such averages, therefore, tend to obscure differences which become apparent when one compares the growth patterns of individual children. A study of individual growth curves discloses, for example, that not all adolescent boys have their maximum spurt of growth at the same age, and that girls also show similar differences. This fact is well illustrated in Figures 4 and 5, from Shuttleworth's 1939 monograph, which is based on the data from the Harvard Growth Study (26).

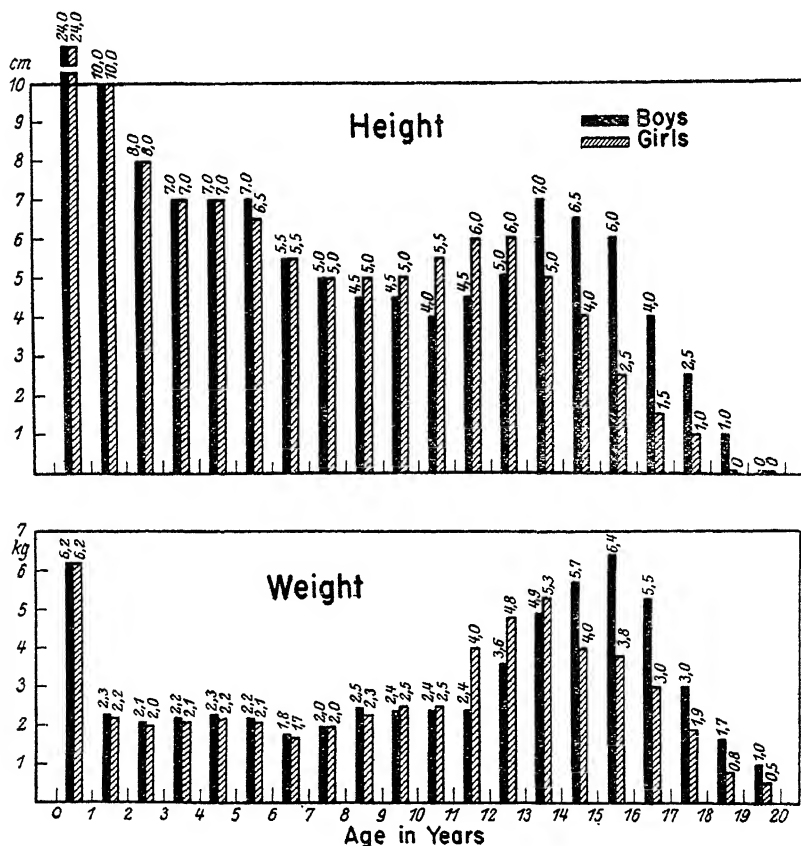


FIG. 3.—Annual increments in height and weight. (After Pfuhl.)

Figure 4 depicts growth trends in average standing height of nine groups of girls having different ages at maximum growth. Figure 5 shows similar differences in ten groups of boys. It will be noted that there is a considerable range in the average standing height of the girls between about ten and fourteen years of age and a somewhat

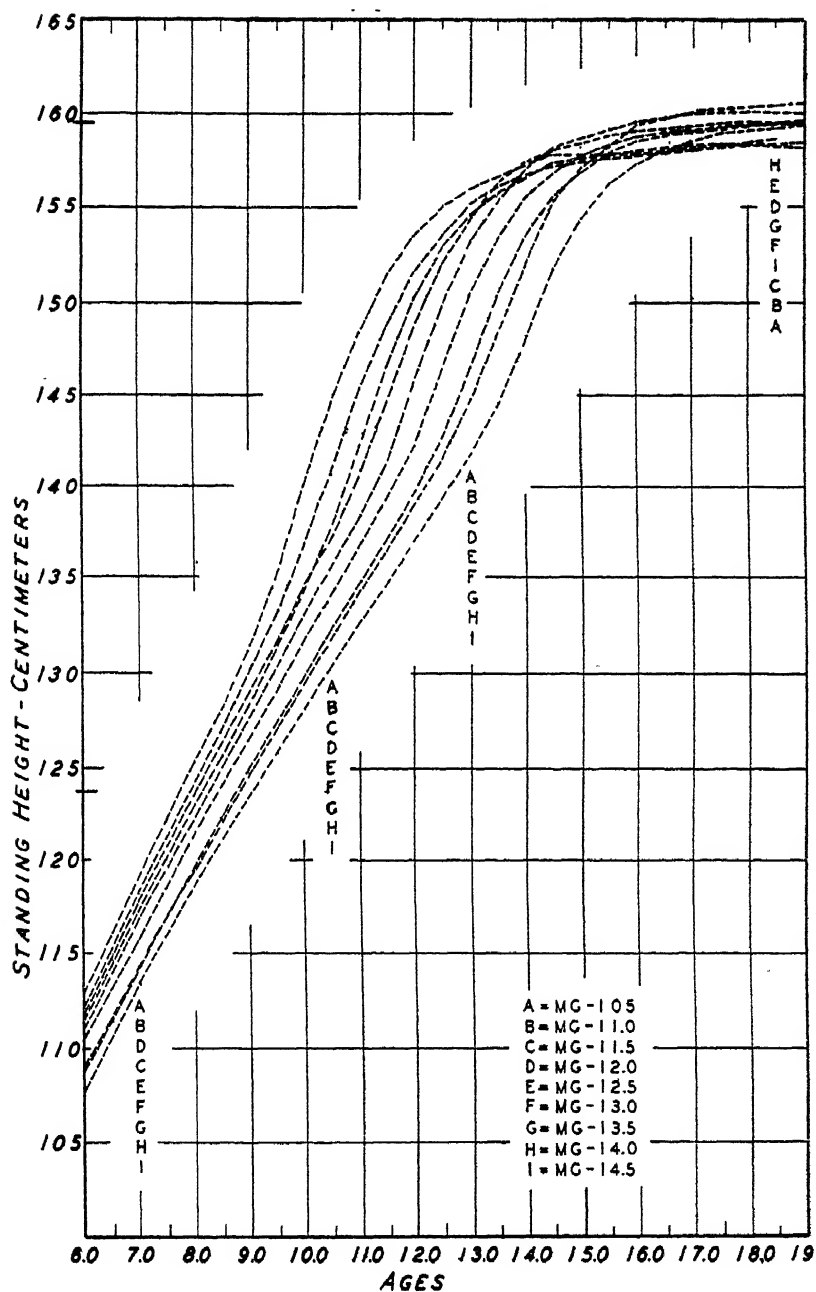


FIG. 4.—Growth trends as related to age at maximum growth (girls). (After Shuttleworth.)

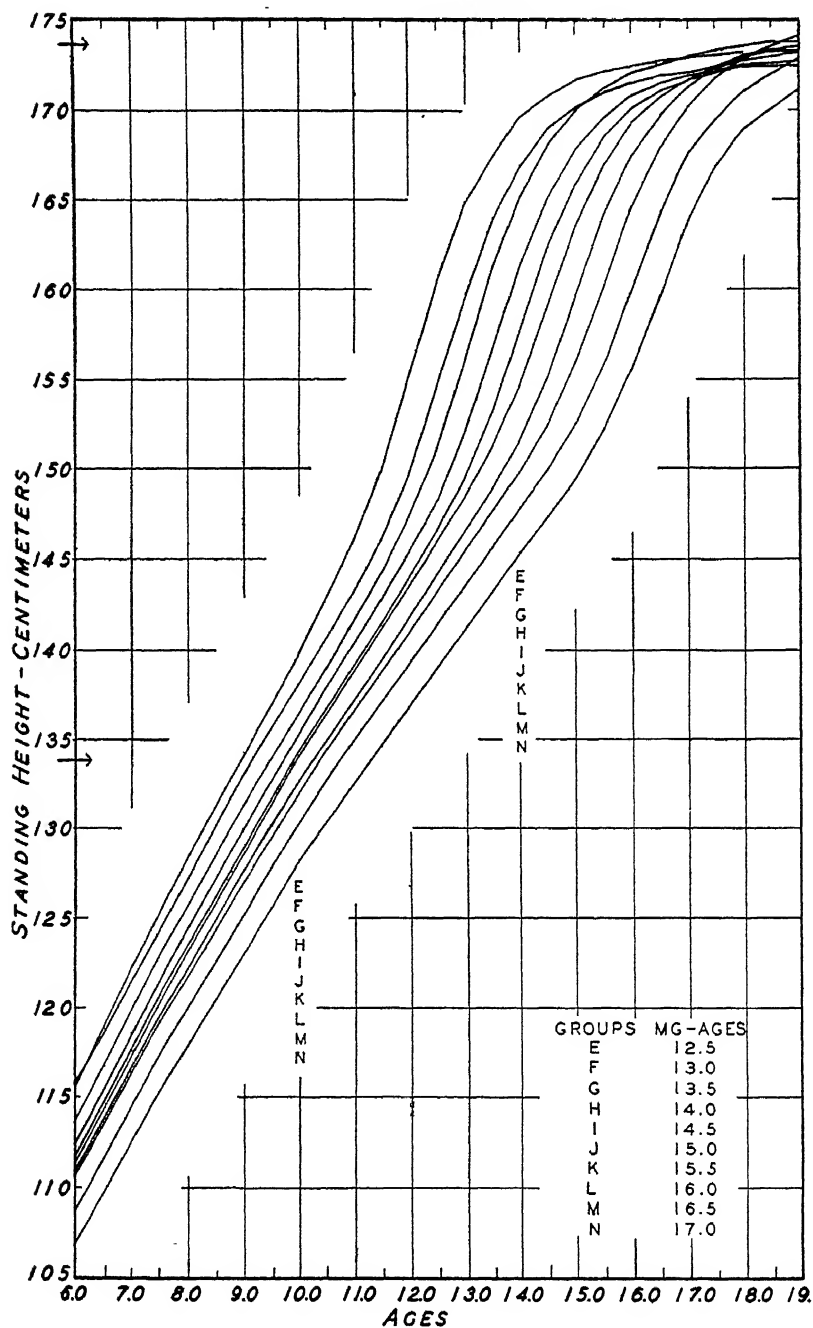


FIG. 5.—Growth trends as related to age at maximum growth (boys). (After: Shuttleworth.)

comparable range in the average standing height of the boys between about thirteen and seventeen years of age. Obviously, a single average height for either the boys or for the girls at any one age within those periods would be much less representative of the group than would their average heights at seven or eight years of age, when there is a much smaller range in their stature.

We have seen an example of a growth pattern based on average increments in height and weight as observed in groups of children of different ages. It should be emphasized that these were different children in each age group, not the same children weighed and measured in successive years. We have seen also, that there is considerable variation as regards the age at which the so-called preadolescent spurt of growth occurs in different children and that the resulting variability must be taken into account when interpreting reported average heights and average weights of children in that age group.

Since such variability occurs even among children of the same racial stock, it is not surprising to find an even greater variability among adolescent children in a population as heterogeneous in race and in national antecedents as that of many parts of our country. These facts suggest some of the limitations of various height-weight-age standards, especially when they are applied to our adolescent children.

II. ENDOCRINE FACTORS IN GROWTH AND DEVELOPMENT

We have been considering the growth of children, specifically the amount that they increase in height and weight from year to year. Let us turn now to a consideration of those developmental changes which begin to manifest themselves early in the second decade of life and which have come to be recognized as representing successive stages in the child's progress towards maturity.

These maturative changes are believed to be initiated and, in part, maintained by hormones produced by the anterior lobe of the pituitary gland. Two of these hormones are of especial interest in this connection. The first is the growth hormone, which enables the healthy, adequately nourished child to attain its maximum normal body size. In the absence of an adequate amount of this hormone, normal growth does not occur, and a form of pituitary dwarfism results. If an excessive amount of growth hormone is produced by the pituitary gland of a child or a young adult, pituitary gigantism ensues.

The second pituitary hormone of importance in maturation is the gonad-stimulating, or gonadotrophic, hormone. In children, just be-

fore the onset of puberty, this hormone begins to be produced in a quantity sufficient to cause their immature gonads to grow and eventually to develop into mature ovaries or testes. This same hormone helps to sustain the functional integrity of the ovaries and testes throughout the individual's reproductive life. An inadequate production of gonadotrophic hormone in the preadolescent child, prevents the normal growth and development of the ovaries or testes, and, indirectly, that of the other reproductive organs as well, and results in a hypogonadal or hypogenital condition, in which the reproductive organs remain in an immature state and the various secondary sexual characters fail to develop properly. On the other hand, the presence of an excessive amount of this gonadotrophic hormone in early life produces one type of precocious sexual development.

Once the gonads have started to develop in response to the gonadotrophic hormone of the pituitary gland, they begin to produce hormones of their own in significant quantities. The ovarian hormones stimulate the growth of the breasts, the mammary glands, the uterus, the Fallopian tubes, the vagina, and cause the development of the various secondary sexual characters proper to the female. The male hormones, similarly, stimulate the growth and development of the prostate gland, the seminal vesicles, the penis and associated structures, as well as the male secondary sexual characters, the growth of the beard, deepening of the voice, etc.

The gonadal sex hormones have another important function: they act upon the pituitary gland and seem to cause a gradual reduction in either the amount or the effectiveness of the growth hormone produced by that gland and eventually stop its action completely. We noted previously that the pituitary gland must produce an adequate amount of growth hormone at the proper time if the child is to grow normally. It is equally true that the child's gonads, the testes or ovaries, as the case may be, must produce a sufficient quantity of their own hormones if growth is to cease at the proper time. If the testes or ovaries begin to function at the requisite level too early in life, growth is arrested prematurely and the child ends up abnormally short. If, on the other hand, the adequate production of the ovarian and testicular hormones is unduly delayed, growth, particularly that of the limbs, continues for too long a period and the characteristic bodily proportions of the eunuch are attained. It appears, therefore, that normal growth and development are contingent upon the reciprocal and properly timed action of pituitary and gonadal hormones. The validity of this hypothesis has been verified conclusively by numerous experiments on animals. In

this, as in so many other cases, nature has anticipated man's experiments by making some of its own on man. Let us look at the results of one of nature's tragic experiments in this field. Figure 6 shows the appearance of a sexually precocious child at three years and eleven months of age (30).

When she was about one year old, it was noticed that her breasts were larger than normal, and when she was three years and seven months old, she menstruated for the first time. At the time that the

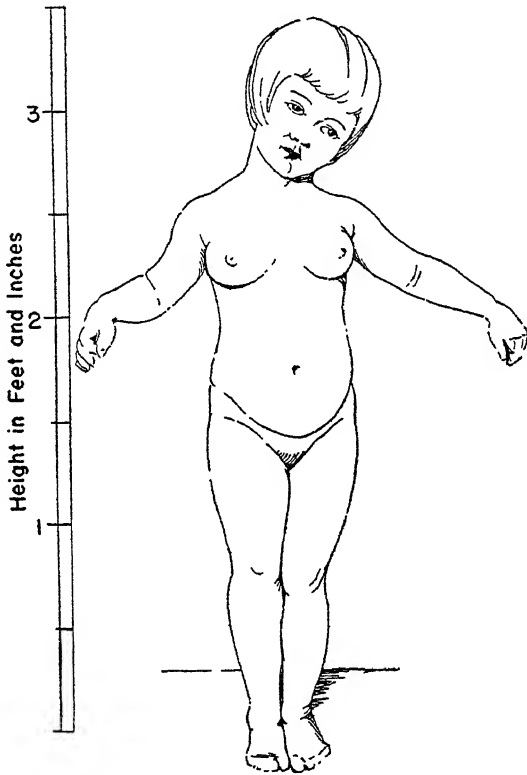


FIG. 6.—Physical changes in premature puberty. (After Thoms and Hershman.)

photograph (on which this figure is based) was made she was forty-two inches high and weighed fifty pounds.

During normal puberty, the development of the breasts is among the earliest external manifestations of beginning sexual maturation, and the breast changes are usually well under way before the pubic hair appears in any considerable quantity. The growth of axillary hair usually begins after the pubic hair is fairly well developed and

is ordinarily preceded by the menarche, the first menstruation. It is interesting to note that, although in precocious puberty all of these changes occur abnormally early, the order in which they appear is substantially the same as that observed in normal puberty.

Children in whom puberty occurs precociously end up small in stature. This is understandable in the light of what was said earlier in this chapter about the action of the gonadal hormones in suppressing the production of pituitary growth hormone. In these cases the gonadal hormones are produced abnormally early in quantities sufficient to suppress growth before the normal adult stature has been attained. It was also mentioned earlier that the absence of adequately functioning gonads during childhood results in a lack of sufficient gonadal hormones to suppress the production or the effectiveness of the pituitary growth hormone. Under such conditions, growth continues for too long a period and the individual ends up quite tall, with disproportionately long limbs, imperfectly developed genital organs, and other typically eunuchoidal characteristics.

We have considered the effects of gonadal hormones on physical growth and development in two contrasting pathologic states. It should not be implied that the gonadal and pituitary hormones are the only factors involved in the processes of growth and development. If the latter are to proceed normally, however, it is essential that these hormones be present in adequate quantities at the proper time. Let us consider, next, the influence of these hormones on the growth and development of normal girls and boys.

III. GROWTH OF EARLY- AND LATE-MATURING CHILDREN

Figure 7 from Shuttleworth (25) shows individual growth curves of ten girls whose menarche (first menstruation) occurred between the ages of ten years, seven months and eleven years, three months; and of ten girls whose first menstruation occurred between the ages of fourteen years, five months and fifteen years, two months. Attention is directed to several points which are illustrated in Figure 7. It will be noted, first, that the girls who attained menarche at the younger age were, on the average, taller during the period from about eight and one-half to twelve years than were those in whom the menarche occurred later. The girls in the late menarcheal group, however, continued to grow after the growth of the girls in the other group had practically ceased, and they ended up taller than the others. These curves show also that the rate of growth in stature decelerates rapidly after the menarche.

The menarche indicates that the girl has made considerable progress toward sexual maturity and that the quantity of ovarian and

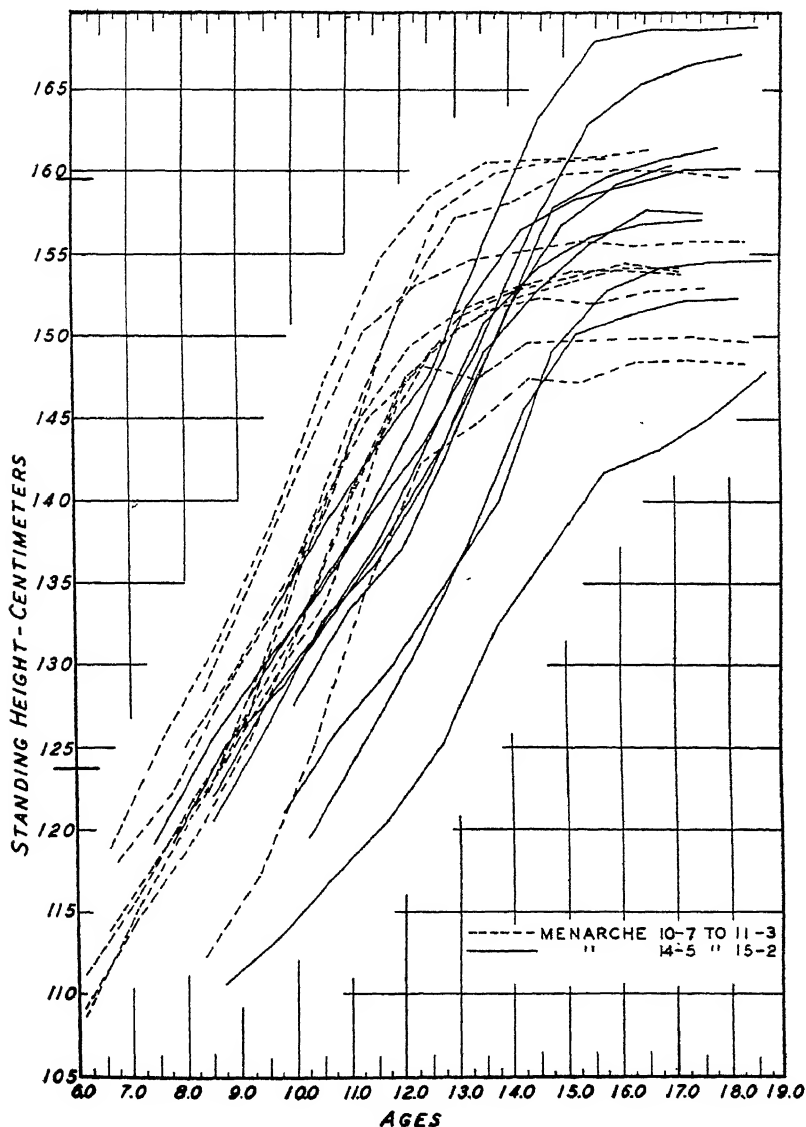


Fig. 7.—Growth trends as related to age at menarche. (After Shuttleworth.)

other hormones in her blood has increased to a point at which the necessary changes in the uterus which precede and accompany menstru-

ation are evoked. Once that level of ovarian activity has been attained, the growth-stimulating action of the pituitary gland is diminished and the rate of growth rapidly decreases. This sequence of events is the same as that which occurred in the case of the precocious puberty described above. That girl was quite large for her age before her first menstruation, but she ended up very small in stature because the gonadal and other changes associated with her sexual maturation were initiated and completed abnormally early. The relation between the menarche and the deceleration of the growth curve is strikingly shown

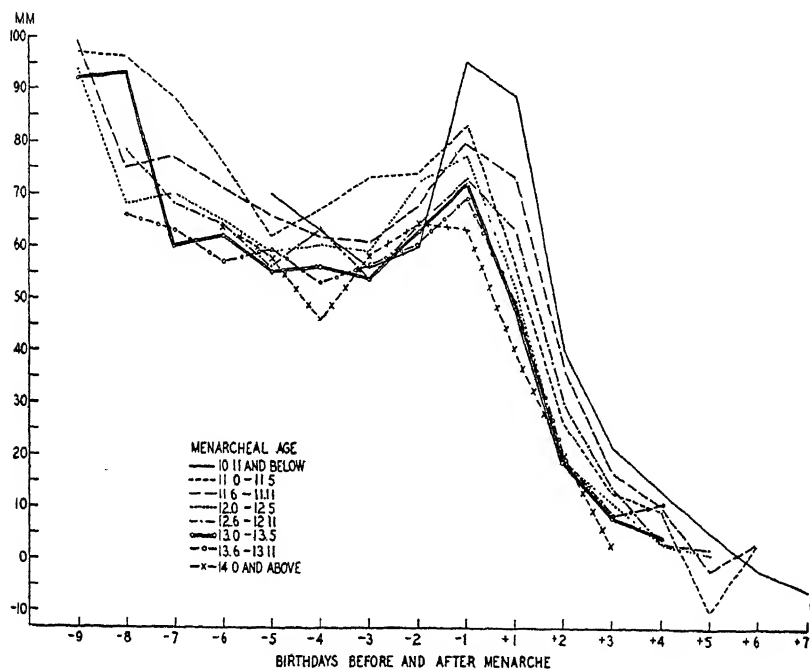


FIG. 8.—Annual increments in standing height. (After Simmons and Greulich.)

in Figure 8, which is based on annual increments in standing height of eight groups of girls enrolled in the Brush Foundation Study who attained menarche at different ages. The curves are arranged so that the points corresponding to the age at menarche are in the same vertical plane. Though there is no clear-cut point in the development of boys which corresponds to the menarche, they, too, show a rapid deceleration in growth after their sexual development is well under way.

Let us consider now the development of some of the primary and

secondary sexual characters which takes place in boys and girls during puberty and early adolescence.

IV. THE VOICE CHANGE

The beginning of the transition from the comparatively high-pitched voice of boyhood to the deeper voice of the adult male occurs at somewhat different levels of development in different puberal boys. Only rarely does the beginning of this change occur before some pubic hair is present. In the great majority of cases sexual maturation is somewhat further advanced before the voice has changed preceptibly. Only rarely is the beginning of the voice change delayed until later in development. The change is usually not completed until early adulthood.

It is well known that the voices of vigorous young men differ widely from each other in pitch and in those other qualities which contribute to producing their total effect. Comparable voice differences exist also among adolescents of the same developmental status. Interpreting those differences it should be remembered that, except in extreme cases, there is no necessary relationship between depth of the voice and the degree of masculinity. It would be quite difficult, for example, to prove that, in general, bassos are any more masculine than tenors, even though it is possible that a rather good case could be made out against male sopranos.

V. THE SKIN AND ASSOCIATED STRUCTURES

The skin, the hair, and the cutaneous glands undergo certain striking changes during adolescence. These are, for the most part, a reflection of changes associated with the maturation of the reproductive system. So intimate is the relationship between the integument and the reproductive system during this period of life that the former reflects rather accurately the developmental status of the latter.

Three kinds of hair succeed each other as the dominant type during the life of man. During approximately the last three months of intra-uterine life, the fetus possesses a fairly well-developed coat of fine, unpigmented hair which is called *lanugo*. Toward the end of fetal life the lanugo is gradually replaced by the *vellus* or *down* hair, which persists during infancy and childhood. The vellus is to a large extent replaced later by the *terminal* hair, which becomes the dominant type in the adult. The distinction between lanugo, the hair of the fetus, and vellus, the hair of infancy and childhood, is largely an arbitrary one, for they resemble each other very closely. Both types are relatively

unpigmented, they both lack a medulla (core), and both are covered with relatively large scales. Terminal hair, however, is readily distinguishable from vellus by its greater average length and diameter, its greater pigment content and by the presence in most instances, of a well-defined core or medulla.¹

On the head and other parts of the body the replacement of the vellus by the terminal hair begins during early childhood, is markedly accelerated during puberty, and continues at a less rapid rate throughout life. The replacement is, however, never entirely complete, since some of the down hair persists as such into old age. It is interesting to speculate about the mechanism involved in the maturation of the hair follicles and on the reasons why a particular follicle should increase in size and begin to produce a relatively coarse medullated hair, while a follicle next to it, presumably exposed to the same hormonal environment, persists apparently unchanged and continues to produce vellus hair throughout the life of the individual. It would seem to indicate the existence of individual differences in the capacity of hair follicles to respond to whatever stimuli are responsible for the transformation of a vellus-producing follicle into one which gives rise to a definitive terminal hair.

Stein (28) has called attention to the value of the shape of the hair line on the forehead as a secondary sexual character. He stated that the hair line of immature boys and of both girls and women has the form of an uninterrupted bow-like curve (Figure 9, upper row). In mature males, however, this curved hair line is interrupted by two wedge-shaped indentations, one over each side of the forehead (Figure 9, lower row). Stein named these areas the *calvities frontalis adolescentium*. The present writer (8) found this character to be a late rather than an early developmental feature, and (confirming Stein) to be uniformly absent among young men classified as "hypogenital" or "hypogonadal." Since, however, it is also absent, or very poorly developed, in some apparently quite normal men, we cannot regard it as invariably associated with adult masculinity.

a. *Facial Hair*. The vellus of the upper lip, cheeks, chin, and sub-mandibular region resembles that of the other parts of the body and shows no marked sexual difference during childhood. In boys, at about the time of puberty, the downy hairs at the corners of the upper lip become conspicuous, due to their increase in size and, later, in pigment

¹ For a more detailed description of the characteristics of the various types of human hair, the reader is referred to Danforth's comprehensive monograph on that subject which has been consulted in the preparation of this section (3).

content. This development extends medially from each corner of the upper lip and results eventually in the formation of a mustache of rather fine hair which is perceptibly longer, coarser, and darker than the vellus which it replaced. Shortly after this juvenile type of mustache begins to differentiate, the vellus over the upper part of the cheeks undergoes a similar increase in length and diameter. It appears to grow even more rapidly than the hair on the upper lip, but its

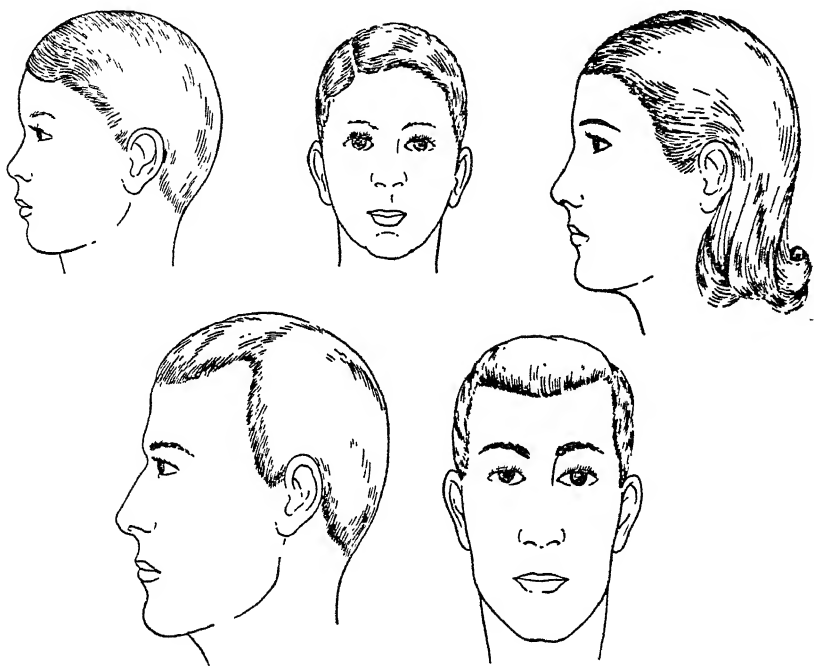


FIG. 9.—Adolescent changes in hair line and facial contour.

pigmentation does not increase as markedly. Instead, it persists as rather unsightly, long, coarse down for a considerable period, until the juvenile mustache is fairly well developed. At about the time when the growth of vellus on the cheeks becomes apparent, that of the area surrounding the midline just below the lower lip attains a length at which it is readily perceptible. Somewhat later, a sparse growth of long, rather coarse, pigmented hair appears along the sides and lower border of the chin and on the upper part of the sides of the face, just in front of the ears. Hair of the same type is not usually present on the throat and the submandibular region until later in adolescence. The definitive terminal hairs of the beard result from the gradual de-

velopment of vellus hairs which become progressively coarser and more heavily pigmented as their differentiation proceeds.

The final density of the beard, like the form and degree of pigmentation of its constituent hairs, is genetically determined, but the expression of this aspect of the genotype is, of course, contingent upon the possession of normally functioning endocrine glands. In evaluating the development of facial hair in adolescent boys, the great variability in beard density among normal men should be kept in mind; for that variability is reflected in comparable differences in the amount and in the degree of differentiation of facial hair among adolescents who are otherwise of the same developmental status.

There is usually no terminal hair on the face of girls or young women. Occasionally, however, especially in dark complexioned girls and women, there is a conspicuous growth of fine, pigmented hair on the sides of the face and some coarser, shorter, and darker hairs on the upper lip. In the absence of other suggestions of masculinization, a slight to moderate amount of such facial hair is no indication of any lack of femaleness. School physicians can render a very helpful service to girls who have such hirsutism by assuring them that there is nothing abnormal about the condition.

b. Pubic and Axillary Hair. The replacement of vellus by terminal hair in the pubic and axillary regions follows a pattern which, in connection with other criteria, provides a serviceable basis for assessing maturity levels. For boys, this pattern of development has been described and illustrated in Greulich *et al.* (8), together with an account of associated changes in genital organs. Serial photographs, included in that treatise, provide a basis for assessing developmental levels during puberty.

In most cases axillary hair appears later than pubic hair, and shows little or no difference in relation to sex. In the case of pubic hair, however, it has been customary to attach some importance to the shape of this area as defined by its upper border. A horizontal border has been described as a normal characteristic of women, while an upward extension of terminal hair along the midline (from the pubic area to, or beyond the umbilicus) is regarded as a male secondary sexual character. Although these generalizations probably hold for the majority of white men and women in our population, numerous exceptions occur, and there is little indication that these exceptions tend to be less masculine or feminine than those who conform to the textbook concept.

c. The Axillary Sweat Glands. For a variable period before the growth of hair begins within the axillae (arm pits), there is a marked

increase in the amount of axillary perspiration. This is due to the increased secretory activity of both types of sweat glands which occur in that region: the merocrine glands, which are of the same type as those over most of the rest of the body, and the apocrine glands, which tend to be limited to the axillae and to the mammary, genital, and anal regions and to the groin. They are especially large and numerous in the axillae.²

There appears to be a close relationship between the activity of the apocrine sweat glands and the functional status of the reproductive system. In a histological study (7) samples of axillary skin which were obtained at autopsy from more than 100 children disclosed that the apocrine sweat glands of the axilla begin to enlarge shortly before puberty but that they do not attain their full development until puberty is well advanced. This is consistent with the observation that in boys the characteristic odor of axillary perspiration is usually not detectable until puberty and that it becomes more pronounced during early adolescence.

In women the apocrine sweat glands are reported to undergo a cycle of secretory activity during the menstrual cycle (12, 13). Their increased secretion during the premenstrual portions of the cycle is thought to be primarily responsible for the annoying increase in underarm perspiration which many women experience at that time. The removal of the ovaries is said to be followed by the involution of the apocrine sweat glands and similar regressive changes are believed to be initiated at the menopause. There is no comparable body of information about possible cyclic or other functional variations in the apocrine sweat glands of adolescent boys or of men.

The reported relationship between the secretory activity of the apocrine sweat glands and the sexual cycle in women and the characteristic odor of axillary perspiration in both men and women lend credence to the opinion of some comparative anatomists that the apocrine sweat glands are related phylogenetically to the scent glands of some other mammals.

² The apocrine sweat glands are distinguished from the ordinary, or merocrine, type by their greater average size, by their alkaline secretion, and especially by the peculiar manner in which their secretion is produced (24). The duct of an apocrine sweat gland usually opens into the upper portion of the hair follicle with which it is associated and the secretion passes upward along the side of the hair to the surface of the skin. The secretion of the merocrine sweat glands is usually slightly acid in reaction, the cells composing them remain intact despite their secretory activity, and their ducts open directly onto the free surface of the skin.

d. *Sebaceous Glands*. A third type of gland which occurs in the skin is the sebaceous gland. Usually intimately associated with hair follicles, sebaceous glands are absent from the skin in some regions of the body, for example the palm, and the lack of their secretion is to a large extent responsible for the annoying cracking and splitting of the skin of that region which occurs rather frequently in older individuals. In some regions, for example on the wings of the nose, these glands are especially large and are associated with disproportionately small hairs.

The sebaceous glands become especially active at puberty and their increased activity is regarded by some as an important factor in the causation of the acne which so often occurs during that period of life. The findings of some recent investigators suggest that an imbalance of the so-called "male" and "female" sex hormones—specifically, an excess of "male" or androgenic hormones—may be an important factor in the causation of acne. The fact that good results have been reported in the treatment of acne by administering "female" or estrogenic hormones adds plausibility to this hypothesis.

VI. THE MAMMARY ORGAN

In addition to the possession of a hairy coat at some time during their life, mammals are distinguished from all other vertebrates by the possession, at least in the female, of mammary glands, which enable them to suckle their young.³

³In lower mammals there is a variable number of mammary glands in the adult. In some cases they are located in the region of the groin and in others, on either side of the midline of the ventral abdominal wall. The human embryo develops a pair of thickened ectodermal ridges which extend at first from the axilla to the groin on each side but which soon become inconspicuous except in the pectoral region. These ridges, the so-called milk lines, are very similar both in appearance and position to the corresponding structures in the embryo of those forms in which several pairs of mammae are present in the adult. In the human embryo only that portion of the milk ridge which comes to be located in the pectoral region persists, and only one pair of mammae develops. The occasional occurrence of more than the normal number of mammae represents instances of the persistence of some portion of the milk ridge which normally disappears. Cases of supernumerary mammae located in other regions, for example on the hip, as have been reported, would on this assumption have to be regarded as instances in which tissue which was originally a portion of the milk ridge became displaced during development. These supernumerary mammae may be unilateral or bilateral and may occur at any point along the original milk ridge from the axilla to the groin. Following pregnancy these extra mammae secrete milk if they contain sufficient glandular tissue.

a. The Female Mammary Gland. The mammary papilla (nipple) usually does not project above the level of the surrounding structures until about the third year after birth. It then becomes somewhat conical but does not obtain its full size until puberty. A very useful account of the external development of the breasts in human females is that of Stratz (29). He recognizes the following developmental stages (see Figure 10): (a) the form characteristic of early childhood, in which only the papilla is slightly elevated above the surrounding areola; (b) the bud stage, which is attained by many girls in the tenth or eleventh year, even earlier in some cases; in others it does not occur until a year or so later and is soon followed by (c), a stage of development, the "primary" breast, in which, due principally to an increase in

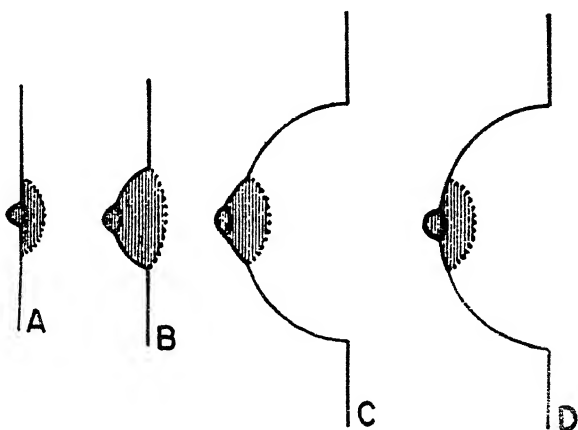


FIG. 10.—Stages in breast development. (After Stratz.)

the amount of fat underlying and immediately surrounding the papilla and areola, the latter become raised still higher above the level of the chest wall. This is succeeded by what Stratz termed (d), the "secondary" or "mature" breast. The breasts of some adult women never attain this supposedly final stage of development but remain in the "primary" stage (c) throughout life and, apparently, function quite as efficiently as do the "secondary" type.

b. The Male Mammary Gland. Though the mammary apparatus of the human male persists as a rudimentary structure throughout his life, it seems to retain its capacity to grow and to develop in response to certain types of hormonal stimulation. The transitory enlargement of the breasts in the newborn male (and female) is a well-known phe-

nomenon. It is usually interpreted as a response of the mammary rudiment to the stimulus of the maternal hormones which have passed through the placenta into the blood stream of the fetus. This hormonal stimulus is sometimes sufficiently strong to evoke the production of a small amount of mammary secretion, the so-called "witches' milk" (14).

Due probably also to hormonal action, a marked enlargement of one or, more frequently, of both breasts occurs in many quite normal boys during early adolescence. Occasional reports of cases of this type of breast enlargement in adolescent boys are to be found in the medical literature of the past hundred years. Some of the earlier writers considered the condition pathological and the name *mastitis adolescentium* came to be applied to it. They are now regarded merely as a reflection of a normal physiological state associated with puberty and beginning sexual development.

VII. THE MENARCHE AND MENSTRUATION

During the sexual life of the woman cyclic changes take place in uterine tissues which are apparently initiated and controlled by hormones elaborated by the ovaries. An early external indication of the beginning of these cyclic uterine changes is the first menstruation, or menarche, which occurs usually during the first half of the second decade of life. The time at which the menarche occurs is determined not only by the child's chronological age but also by its developmental status and so is influenced by racial, familial, nutritive, climatic, emotional, and other factors. Schaeffer (23), during the early part of the twentieth century, determined the age at first menstruation of 10,500 girls in Berlin. The average age for the group was fifteen years, seven months, a figure somewhat higher than that found by more recent investigators. Neurath (18) gives twelve to fourteen years as the average age at menarche of girls in Central Europe.

Some of the most accurate information which we have on this point is that based on a study of 250 girls in the Hebrew Orphan Asylum of New York City (4). In that institution the date of the menarche was noted in the child's medical record, as were also the dates and duration of all subsequent menstrual periods. The average age at menarche for that group was found to be 13.5 years, with a range of from 11 to 16.3 years. From earlier evidence, this is probably somewhat higher than the average of noninstitutionalized Jewish girls.

The mean age at menarche of two hundred girls who were enrolled in the Brush Foundation Study of Growth and Development (26) was

12.5 years, almost a year less than that of the institutional group reported above. The children in the Brush Foundation Study were, as a group, from Cleveland, Ohio, families which were well above average in economic status. There is a considerable body of evidence which indicates that good nutrition and a generally favorable environment tend, within limits, to hasten the onset of puberty and that, conversely, an inadequate diet, severe illness and other unfavorable environmental conditions tend to retard it. These data tend to support that conclusion.

The importance of climate as a factor in influencing the age at menarche seems, in the light of recent investigations, to have been greatly exaggerated. There is, for example, a rather widespread belief that the menarche occurs much earlier in the tropics than it does in more temperate climates. Mueller (17), however, found that the menarche of Javanese girls occurred on the average between the fourteenth and sixteenth years, which is certainly no earlier than the observed age at menarche of girls in Central Europe. He concludes that there is no basis for the assumption that sexual maturation is advanced in the tropics, stressing the fact that recent observers have been unable to find any evidence of such precocity among the natives of Japan, British India, or Egypt. Some of the important literature on this subject is summarized by Novak (19) in his monograph on menstruation and its disorders.

In evaluating the published facts on the average age at menarche, it should be borne in mind that reports given from memory are often quite inaccurate and that conclusions based on such data are likely to be misleading. More precise information on this subject must await the collection of a large number of cases in which the age at menarche is known to have been accurately determined.

In 1934, Fluhmann (5) published his observations on the length of menstrual cycles observed in seventy-six healthy young California women. Their cycles were found to vary from 11 to 144 days, although (with a mean at 30.4 days) the vast majority fell between 18 and 42 days. His individual cases were divided into two main groups; the first, including one-third of the subjects, were those in whom there was a reasonable degree of regularity in the length of successive menstrual cycles. Nine of these women had cycles of from 26 to 30 days duration, while in six the cycles tended to be shorter, and in thirteen longer. The second group, comprising two-thirds of the cases were characterized by a marked irregularity in the length of successive cycles. It is interesting to note that only five of the seventy-six subjects showed absolutely regular cycles. Fluhmann found no relation between the length

of the menstrual cycle and the duration of the flow, which was 4.6 days on the average and varied from three to seven days in the majority of instances. The same author had previously pointed out that any marked deviation in the length of the flow appears to be of greater clinical significance (as indicating possible abnormality) than irregularities in the length of the cycle itself.

The irregularity which Fluhmann found in his cases is not significantly greater than that which had previously been noted by various other investigators (1, 6, 11, 20). In view of this variability in the length of the cycle of adult women, it is not surprising to find that there is an even greater irregularity in the cycles of young girls during the first few years after the menarche. (4, 9). This should make one reluctant to attribute to the menarche itself the importance as a criterion of maturity which is commonly ascribed to it by writers on adolescence; for it seems probable that some of the same factors which are responsible for the marked irregularity of the early menstrual cycles in girls can operate to advance or retard the occurrence of the menarche itself. Moreover, the idea that the latter necessarily indicates the attainment of a degree of sexual maturity which would make reproduction possible is probably not correct.

Hartman (10) has shown that in the puberal Macaque monkey approximately a year elapses between the first menses and the first conception, despite frequent matings in the interim. Yerkes (31) reported that a chimpanzee in his colony did not become pregnant until about thirteen months after her first menses, although she had been caged with an adult male continuously throughout that period. That the menarche may be associated with a comparable degree of sexual immaturity in girls is suggested by the fact that in some primitive societies in which rather promiscuous sexual relations are permitted among adolescents the girls involved are said rarely to become pregnant during that period (2, 15). This assumes, of course, that the adolescent boys involved are sufficiently mature to be producing spermatozoa in adequate numbers, and evidence is lacking on this point. In view of these facts, it would seem best to regard the menarche as neither a dependable criterion of maturity nor as necessarily the expression of any narrowly circumscribed stage of sexual maturation. It is rather the reflection of a physiological state which may occur at different times during the puberal period in different individuals and which usually precedes by a considerable interval the attainment of the capacity to reproduce.

REFERENCES

1. AREY, L. B. "Degree of Normal Menstrual Irregularity: Analysis of 20,000 Calendar Records for 1500 Individuals," *American Journal of Obstetrics and Gynecology*, XXXVII (1939), 12-29.
2. ASHLEY-MONTAGU, M. F. "The Adolescent Sterility Period in Man," *American Journal of Physical Anthropology*, XXI (Supplement, 1936), 13.
3. DANFORTH, C. H. *Hair, with Especial Reference to Hypertrichosis*. Chicago: American Medical Assn., 1925. Pp. 152.
4. ENGLE, E. and SHELESNYAK, M. "First Menstruation and Subsequent Menstrual Cycles of Pubertal Girls," *Human Biology*, VI (1934), 431-53.
5. FLUHMAN, C. F. "The Length of the Human Menstrual Cycle," *American Journal of Obstetrics and Gynecology*, XXVII (1934), 73-78.
6. FRAENKEL, L. "Keimdrüse, Reifung, Ovulation," *Handbuch der Normalen und Pathologischen Physiologie*, Bd. 14, Erste Hälfte, Erster Teil. Berlin: Julius Springer, 1926.
7. GREULICH, W. W. "The Relation of the Developing Apocrine Sweat Glands to the Maturation of the Reproductive System in Children," *Anatomical Record*, LXVII (Supplement, No. 3, 1937), 21.
8. GREULICH, W. W.; DORFMAN, R. I.; CATCHPOLE, H. R.; SOLOMON, C. I.; and CULOTTA, C. S. "Somatic and Endocrine Studies of Puberal and Adolescent Boys," *Monographs of the Society for Research in Child Development*, Vol. VII, No. 3, 1942. Pp. 85.
9. HARTMAN, C. G. *Time of Ovulation in Women*. Baltimore, Maryland: Williams & Wilkins, 1936. Pp. x + 226.
10. HARTMAN, C. G. "On the Relative Sterility of the Adolescent Organism," *Science*, LXXIV (1931), 226-27.
11. KING, J. L. "Menstrual Intervals," *American Journal of Obstetrics and Gynecology*, XXV (1933), 583-87.
12. KLAAR, JOSEF. "Zur Kenntnis des weiblichen Axillarorgans beim Menschen," *Wiener klinische Wochenschrift*, JHR, XXXIX (1926), 127-31.
13. LOESCHKE, H. "Über zyklische Vorgänge in den Drüsen des Achselhöhlenorgans und ihre Abhängigkeit vom Sexualzyklus des Weibes," *Virchows Archiv für Pathologische Anatomie*, (1925), 255-283-294.
14. LYONS, W. R. "The Hormonal Basis for 'Witches' Milk'," *Proceedings of the Society for Experimental Biology and Medicine*, XXXVII (1937), 207-9.
15. MALINOWSKI, BRONISLAW. *The Sexual Life of Savages*, Vol. I. New York: Horace Liveright, 1929. Pp. 188.
16. MIRSKAIA, L. and CREW, F. A. E. "Maturity in the Female Mouse," *Proceedings of the Royal Society of Edinburgh*, L (1930), 179-86.
17. MUELLER, H. "Enkele waarnemingen omtrent den groei van het beenderenstelsel en omtrent de geslachtsrijpheid van Javaansche meisjes," *Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië*, JHR. XXI, No. 1 (1932), 48-63.
18. NEURATH, R. *die Pubertät*. Vienna: Julius Springer, 1932.

19. NOVAK, E. *Menstruation and Its Disorders*. New York: D. Appleton, 1921. Pp. xvii + 357.
20. OGINO, K. "Ovulationstermin und Konzeptionstermin," *Zentralblatt für Gynäkologie*, LIV (1930), 464-78.
21. PFUHL, W. "Wachstum und Proportionen," in K. Peter, G. Wetzel, and F. Heiderich. *Handbuch der Anatomie des Kindes*, Vol. I, No. 2. Munich: J. F. Bergmann, 1928.
22. PRIESEL, R. and WAGNER, R. "Geschlechtsmerkmale bei Mädchen," *Zeitschrift Konstitutionslehre*, XV (1931), 333-52.
23. SCHAEFFER, R. "Über Beginn, Dauer und Erlöschen der Menstruation; statistische Mitteilungen über 10,500 Fälle aus der Gynäkologischen Poliklinik," *Monatsschrift für Geburtshülfe und Gynaekologie*, XXIII (1906), 169-91.
24. SCHIEFFERDECKER, P. *Die Hautdrüsen des Menschen und der Säugetiere, ihre biologische und rassenanatomische Bedeutung, sowie die Muscularis sexualis*. Stuttgart: Schweizerbart, 1922. Pp. viii + 154.
25. SHUTTLEWORTH, F. K. *Sexual Maturation and the Physical Growth of Girls Age Six to Sixteen*. Monographs of the Society for Research in Child Development, Vol. II, No. 5. Washington: National Research Council, 1937.
26. ———. *The Physical and Mental Growth of Girls and Boys Age Six to Nineteen in Relation to Age at Maximum Growth*. Monographs of the Society for Research in Child Development, Vol. IV, No. 3. Washington: National Research Council, 1939.
27. SIMMONS, K. and GREULICH, W. W. "Menarcheal Age and the Height, Weight, and Skeletal Age of Girls Age Seven to Seventeen Years," *Journal of Pediatrics*, XXII (1943), 518-48.
28. STEIN, R. O. "Untersuchungen über die Ursache der Glatze," *Wiener klinische Wochenschrift*, I (1924), 6-10.
29. STRATZ, C. H. *Der Körper des Kindes und Seine Pflege*, Ed. 3. Stuttgart: Enke, 1909. Pp. xx + 398.
30. THOMS, H. and HERSHMAN, A. A. "A case of Sexual Precocity," *American Journal of Obstetrics and Gynecology*, VI (1923), 349.
31. YERKES, R. M. "A Second-Generation, Captive-Born Chimpanzee," *Science*, XXCI (1935), 542-43.

CHAPTER III

ADOLESCENT CHANGES IN BODY BUILD

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I. THEORIES OF VARIATIONS IN BODY BUILD

In the study of physical growth we are concerned not merely with separate characteristics such as height or weight but also with the relative *proportions* of different parts of the body determining body form or body build.¹ There are several reasons for studying body build—some of them at least as old as Heraclitus, others of recent development. An early interest was in relating specific types of build to tendencies toward certain physical diseases. More or less associated with this interest was the study of body types in their observed (or assessed) relationship to variations in temperament and to pathological manifestations in mental disease. More recently psychologists have studied the possible relationships between physique and various aspects of personality among normal individuals. Still another recent approach to the study of body build is in the interest of gaining more adequate estimates of nutritional status. It has become evident that, as a measure of nutrition, weight in relation to height does not take into account the wide differences which exist in skeletal build and in the proportions of the body and its extremities.

With the exception of studies of nutrition, by far the greatest

¹ For reference to recent studies on body build see Krogman (13) and Kelley and Redfield (10).

amount of research in this field has been conducted with adults, usually males. When we turn to the study of build in children, we find it necessary to take into account not only the varieties of physique as found at a given age but also the processes of growth and the changing proportions of the body which occur in the developing child. In this chapter we shall be concerned primarily with the underlying differences in physiques, as they are found in the adolescent, and with some of the characteristic changes in physique which occur during this period.

Early attempts to classify people according to their physical differences were in terms of body types which were assumed to be discrete and readily classifiable, somewhat as animals may be classified into varieties or subspecies. The early Greeks described these types in terms of the body humors which were thought to determine both build and temperament, using such names as "choleric" and "phlegmatic." Others have typed people according to their supposedly dominant functions, such as "cerebral," "digestive," and "muscular." Most classifications, however, are descriptive of body dimensions or lengths in relation to breadths by such type names as "linear" (or "leptosome") and "lateral." Kretchmer (12), in his famous classification introduced in 1925, assigned the terms "asthenic" and "pyknic" to the two extremes of slender and broad builds, and recognized also an "athletic" group constituting an in-between and more muscular type.

Extensive use of anthropometric measurements for the purpose of defining and delimiting more exactly the different builds has resulted in a considerable alteration in the theory of variations in build. The quantitative treatment of these measurements has made it very evident that large populations do not fall into discrete "types," but are distributed normally throughout a range of magnitudes for any dimension measured. Furthermore, although the magnitudes of different dimensions of the body are correlated, the relationship is by no means perfect between any set of measures. We do not find that one can predict with any accuracy the proportions of an individual merely upon the basis of his classification in one of several types. Therefore, when we classify people according to their body builds we are able to do one of two things. We may select examples which are readily discriminated from each other (often the rare, extreme cases) and study their various physical and mental characteristics, proceeding then to classify others by means of these clinical "standards," according to whether they are more or less similar to the "types" set up. The alternative to this procedure is to describe a person as having proportions which in specified ways deviate to a specified degree from the average. Recent

statistical studies of anthropometrics (exact measurements made with especially constructed instruments) tend toward the latter practice, which gives a much truer picture of normal human variations. This treatment is especially adaptable to anthropometric techniques, but it has also been employed in what we may call clinical, or observational, methods wherein the individuals are rated or arrayed in rank order with regard to various aspects of build.

II. METHODS OF DETERMINING VARIATIONS IN BUILD

Many studies of the growth and changing body proportions of children have been made in terms of the lengths, diameters, and girths of various segments of the body. Out of these studies has come consideration of the differences in build as well as differences in size among children of the same age and physical maturity (3, 4, 14, 15, 18).

It has been found that diameters and circumferences of the body are relatively independent of the measures of height or other linear dimensions. That is, a person who is tall may be slender (asthenic or leptosome), average (athletic), or broad (pyknic) in build; and the same can be said of the average or short man. These variations are often expressed by such ratios as $\frac{\text{hip width}}{\text{height}}$, or $\frac{\text{chest circumference}}{\text{height}}$, or by some more complex combination of transverse dimensions expressed in proportion to height. Although these are the most frequently compared variations, there are other important ones: for example, within the height dimension the relative length of the legs to the body varies and this relationship may be expressed numerically by the $\frac{\text{stem}}{\text{stature}}$ index (or ratio of the length of head and trunk to total height); also, among the transverse dimensions, the relative size of shoulders, chest, and hips varies, and can be indicated in ratios between these measures. It is possible to measure some dimensions much more reliably than others, because of the structure of the skeleton and the disposition of fat and muscle over the body. The indices of build usually employed have been selected because of their reliability and their significance in differentiating the width-length or segmental relationships in different builds.

Among recent studies of human physique the most elaborate are those of Sheldon and his associates (19). On the basis of their investigations they have concluded that three polar types of human physique may be distinguished, the endomorph, the mesomorph and the ectomorph. The most obvious characteristic of individuals of the first

of these types² (see Figure 1A) is a tendency to lay on fat, the absorptive functions apparently overbalancing the energy-expending functions. Members of this group have massive viscera but rather poorly developed extremities. The term *endomorph* is applied to this type because the tissues which appear to dominate the bodily economy are derived in large part from the endodermal cell layer of the embryo.

The second type, the *mesomorph*, (see Figure 1B) is so named because tissues derived from embryonic mesoderm, i.e., bone and muscle,

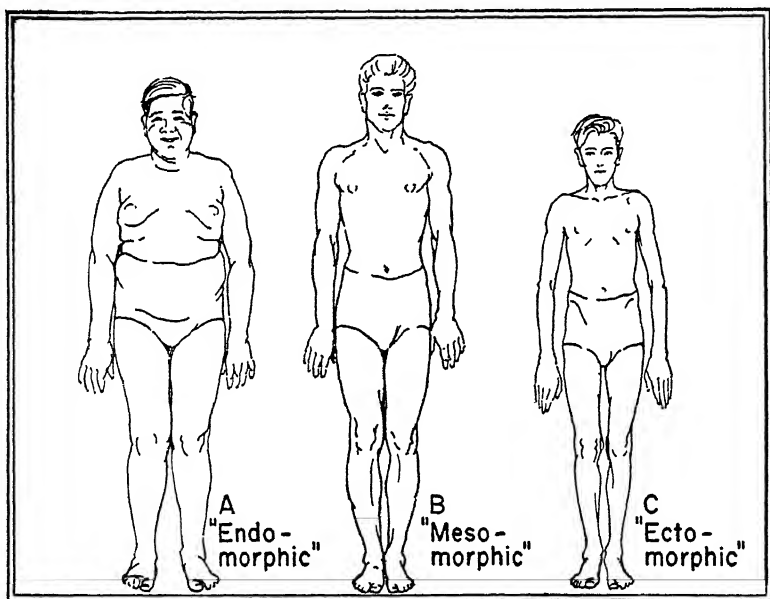


FIG. 1.—Contrasting somatotypes in three boys (age 14).

show the greatest relative development. Members of this group have square, hard, solid bodies. The skeleton is heavy, the skin thick. Extreme muscular development is characteristic. Both shoulders and hips are relatively broad, lending a “block”-like appearance to the physique.

The third type, the *ectomorph*, (see Figure 1C) is characterized by relatively the greatest development of ectodermal structures, viz., the skin and nervous system. Individuals of this type are characteristically thin and present a relatively enormous skin surface by comparison with their body volume. The bones are light, the muscles

² The three cases shown in Figure 1 are from a normal sample of fourteen-year-old boys (Guidance Study, Institute of Child Welfare, University of California).

long, slender and poorly developed. The trunk is short by comparison with the limbs. In general, the physique gives an impression of "thinness," linearity, and fragility. This category corresponds to Kretschmer's asthenic group. The latter's pyknic type includes massive physiques which may fall into either the mesomorphic or endomorphic classifications, more particularly the latter. The "athletic" type may comprise those in whom mesomorphic and ectomorphic characteristics are mixed.

Sheldon's careful description of these three fundamentally different kinds of human physique constitutes a promising advance over older dichotomous classifications, though one not altogether original with him. However, his major contribution to method is not the proposal of yet another set of "types," but a system for dealing with the intermediate bulk of the population which does not fit into neatly discrete categories, but ranges through all the intergradations and combinations of these extreme categories. For him, endomorphy, mesomorphy, and ectomorphy are to be regarded as fundamental dimensions, or continua of human variability, with reference to each of which any individual physique may be described. Each of the three "types" mentioned above comprises persons who possess the characteristics of one of these dimensions in extreme form, and those of the other two dimensions to but a minimal degree. Sheldon has used a seven-point rating scale to define more precisely the degree to which an individual expresses each of these three sets of attributes. By this method, a person whose morphological characteristics belong almost exclusively in the endomorphic category would be rated 7 in endomorphy, 1 in mesomorphy, and 1 in ectomorphy. An extreme "asthenic" by Kretschmer's classification would be rated 1, 1, and 7. An "average" person in whom the three sets of traits are present to a "median" degree and are equally conspicuous, would be rated 4, 4, and 4.

By writing the ratings together as a three-digit number (i.e., 171, 244, etc.) it is possible to provide a code designation of a *somatotype*, the members of which, though by no means exactly alike, represent approximately the same degree of deviation with reference to the three primary dimensions. Sheldon has discovered seventy-six such somatotypes among the population of male college freshmen which he studied.

Obviously a system providing for seventy-six "types" is more flexible, and accommodates a larger percentage of the population than a system which attempts to assign everyone to two or three rigid categories. But such is the complexity of human variation that even with

seventy-six basic groups, Sheldon has found it necessary to refer to several "secondary" features to describe all the morphological differences which may be observed even among members of the same somatotype. These secondary characteristics have to do with the hairiness of the skin (hirsutism), with the general coarseness or refinement of the physique (texture), with the harmony or lack of harmony between different regions of the body (dysplasia) and with the tendency to possess the secondary morphological characteristics of the opposite sex (gynandromorphy). The two latter factors, in particular, may be important in their effect upon the psychological adjustment of the adolescent (cf. chapter v). One can scarcely escape the conclusion that no classificatory scheme which retains the virtue of reasonable simplicity can furnish more than a relatively crude framework for describing the "infinite variety" of human physiques.

Sheldon's work to date leaves unsettled certain important questions. First, one may inquire whether the same range of somatotypes found among boys exists among girls, and whether the relative frequency of the various somatotypes is different for the two sexes. For his population of eighteen-year-old males, Sheldon has presented tables showing the ratios (for each somatotype) of various body dimensions to stature. No corresponding data on girls are as yet available. Second, one may inquire whether a given somatotype is a permanent, fixed characteristic of the individual, or whether it is modifiable either by the processes of normal growth or by special nutritional factors. Sheldon asserts that the adult somatotype is fixed, though no adequate data based on the repeated observation of cases have yet been published. Furthermore, he is of the opinion that the somatotype can be approximately predicted from birth and accurately measured from age six. Both suppositions remain to be tested, and the recognition of mature characteristics "in the bud" presents obvious difficulties. The relation of somatotype to such factors as velocity of adolescent growth and age at maturity constitutes a third problem for future research. In any event, further studies of this type are eagerly to be awaited, for if any such conceptual schema can give order and meaning to the bewildering array of facts concerning adolescent growth thus far discovered, it will represent a scientific contribution of genuine value.

III. VELOCITIES OF MATURING IN RELATION TO BUILD

The normal changes in body proportions of the average boy and girl may be determined from average curves of growth of such di-

mensions as height, weight, shoulder width, hip width, etc. During the period of the adolescent spurt of growth a number of very marked changes occur. Sexual differentiation is seen first in the early, rapid growth of girls. This rapid growth is accompanied by the girls' greater growth of hip-width. The boys' rapid growth starts later, but they soon overtake the girls in height and shoulder width. Further sex differences occur in the distribution of fat and development of secondary sex characteristics. Sex differences in these characteristics, and in the growth curves for height and weight, have been shown in the preceding chapter. Sex differences in transverse dimensions of the body are presented below in Figures 2 and 3, for bi-iliac diameter (hip width) and biacromial diameter (shoulder width).

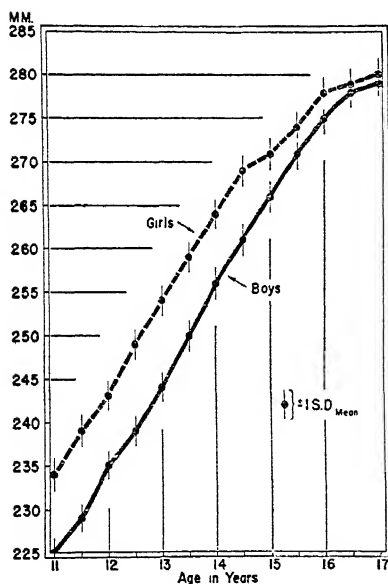


FIG. 2.—Growth in hip width (bi-iliac diameter). (From Bayley.)

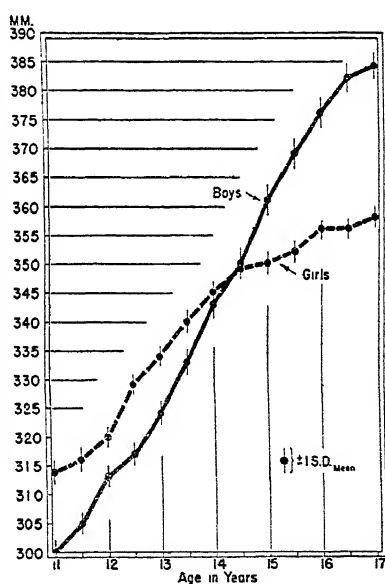


FIG. 3.—Growth in shoulder width (biacromial diameter). (From Bayley.)

It must be kept in mind, however, that these curves [from the Adolescent Growth Study, University of California (4, 9)] represent only the trends of the average. Some children go through these changes much more rapidly and others more slowly. Furthermore, there are characteristic differences in the pattern of growth of *rapid maturing* and *slow maturing* individuals. The pathological extremes of these differences are discussed in the preceding chapter (p. 16). In normal

cases the interplay of glandular and other (hereditary and environmental) factors result in much more moderate variations.

In studying these variations investigators have used a number of different criteria of physical maturity, all of which are closely inter-related (6). In the case of girls, the maturity indicator most commonly employed is the menarche or age of first menstruation.³ No comparable criterion can readily be applied to boys, but ratings or other classifications of boys have often been made in terms of the stage of development of axillary hair, pubic hair, and secondary sexual characteristics (see pp. 21ff). It is also possible to assess maturity levels with reference to the rate of change in bodily size. Shuttleworth (23), for example, using serial records from the Harvard Growth Study, has determined the age when each child attains his most rapid growth;⁴ this has been used as a basis for classifying children of each sex into groups of early-, average-, and late-maturing. Still another measure of physical or physiological maturing is obtained from X-rays of the growing areas of the bones, which permit an objective and fairly precise identification of age changes in one of the basic aspects of development. When X-rays for a given child are compared with age norms or standards, it is possible to estimate the "skeletal age" of the child and compare this with his actual chronological age, somewhat as mental age may be compared with chronological age in determining precocity or retardation. In this connection, perhaps the most useful series of age standards are those furnished by Todd (27, 28) for the bones of the hand and knee, extending from birth to the age when these bone areas become mature (approximately 16.5 years for girls, 18.5 years for boys).

A striking difference between early- and late-maturing children is that the former exhibit a much more intense period of rapid growth, attaining their adult proportions very quickly. This is illustrated for both boys and girls in Figure 4, from the data of the Harvard Growth Study. In terms of increments per year the late maturing (on the average) never grow quite as fast as the early maturing, but on the other hand their growth is continued over a much longer time and extends into much later adolescent ages.

Body proportions are also somewhat different in the early- and late-maturing groups, especially among the boys. This is shown in Figure 5,

³The previous chapter has pointed out some of the defects of this criterion, as applied to individuals. Perhaps its chief serviceability is in providing a rough classification for groups.

⁴See pp. 13-14. Another example of the use of maximum growth age ("M.G.A.") is given on p. 44.

which indicates that during the preadolescent years a decrease occurs in the proportion of *sitting height* to *standing height*. Another way of stating this is to say that during these years the legs, growing more

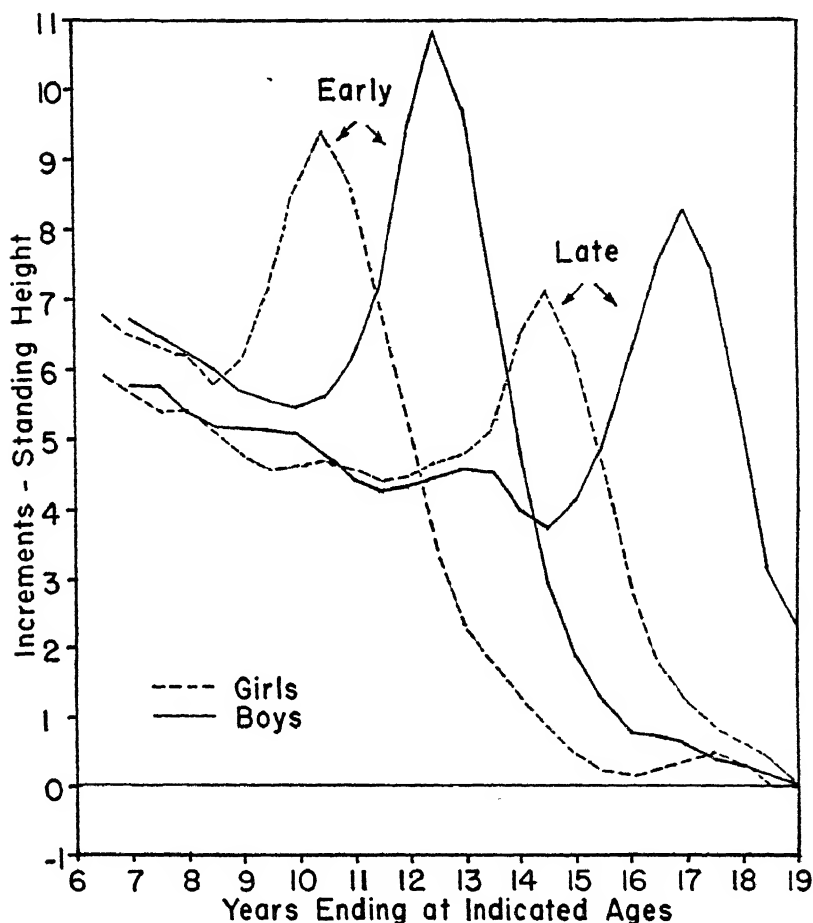


FIG. 4.—Growth in height in terms of average annual increments. (After Shuttleworth.)

rapidly, are becoming relatively longer. Among the early maturing, however, this change in ratio is arrested at about ten years for girls and at about twelve years for boys, thereafter changing its direction, the trunk for a time growing more rapidly than the legs, until the ratio stabilizes as growth is completed. Among the late maturing these changes in the ratio are slower and the inflection points occur about

three years later, with the result that late maturing individuals are longer-legged as adults.

The curves in Figure 5 compare only the extreme groups. Figure 6 presents data (from the California study) which include the average cases as well. In this figure all curves have been adjusted so that any vertical line represents the same degree of maturity of the bones, re-

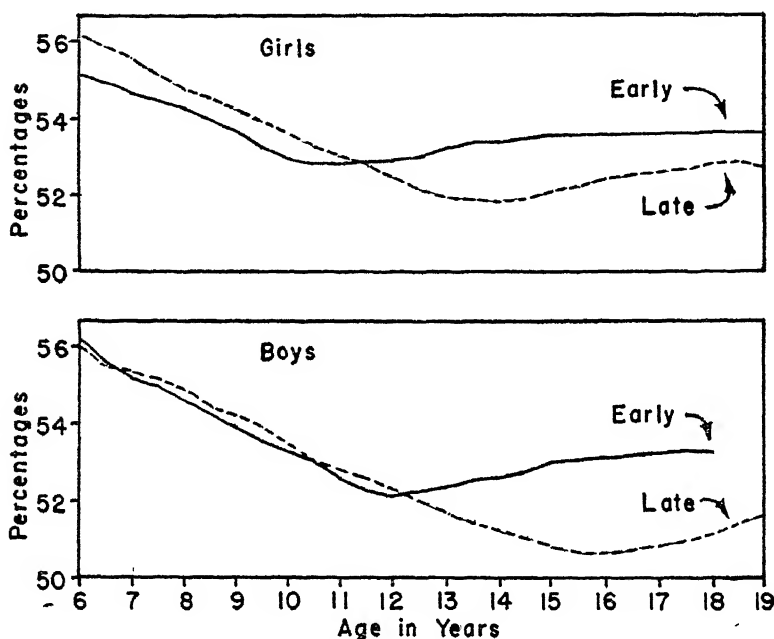


FIG. 5.—Age changes in the proportion of sitting height to standing height. (After Shuttleworth.)

ardless of sex or chronological age. When this is done, we see that for the *same degree of physical maturity* the late-maturing boys stand out as very long-legged as compared to trunk height, while the other five groups are closely similar to each other. The girls have slightly higher ratios than the early- and average-maturing boys, but the late-maturing girls in this sample do not differ in this respect from the other girls.

An additional finding, in the California study, pertains to *width-length* relationships, which can be examined by dividing hip width by height. Starting at about twelve years of skeletal age, girls become relatively broad-hipped, while boys maintain a constant ratio between hip width and height. There are no differences in this ratio for early-

and late-maturing girls of the same skeletal age, but there are marked differences among boys as related to their velocities of maturing. Boys who mature early have broad hips relative to height; boys who mature late have relatively slender hips.

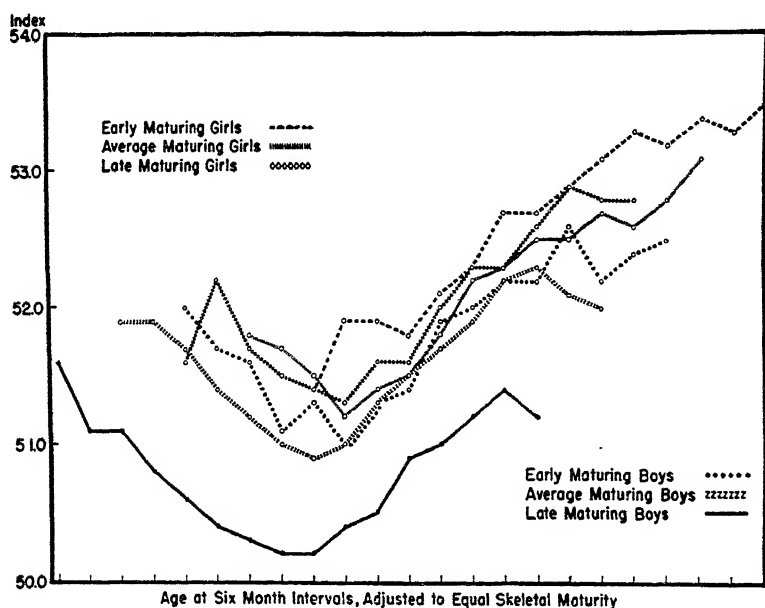


FIG. 6.—Curves of $\frac{\text{stem-length}}{\text{height}}$ indices. (From Bayley.)

Another relationship of some interest is that between *hip width* and *shoulder width*. As would be inferred from Figures 2 and 3, during adolescence boys become relatively broad shouldered in relation to hip width, while the girls become relatively broad hipped. Within each sex group, however, differences can be seen in relation to the rate of maturing. Early-maturing boys tend to have relatively broad hips and narrow shoulders, while the reverse condition (relatively narrow hips and broad shoulders) is to be found among those who are slow to mature. Among girls these differences are less evident, although there is a slight tendency for those late in maturing to have relatively broad shoulders. It is interesting to note that in this one ratio (hip width to shoulder width) *early*-maturing boys and *late*-maturing girls tend to have proportions which deviate slightly from the norm of their own sex toward that of the opposite sex.

For both boys and girls, it is apparent that a longer growing period

frequently involves an emphasizing of shoulder width. Individual cases, however, present many variations in the pattern of development. Within any normal sampling of school children we may expect to find examples of "asynchronous" maturing, in which different parts of the

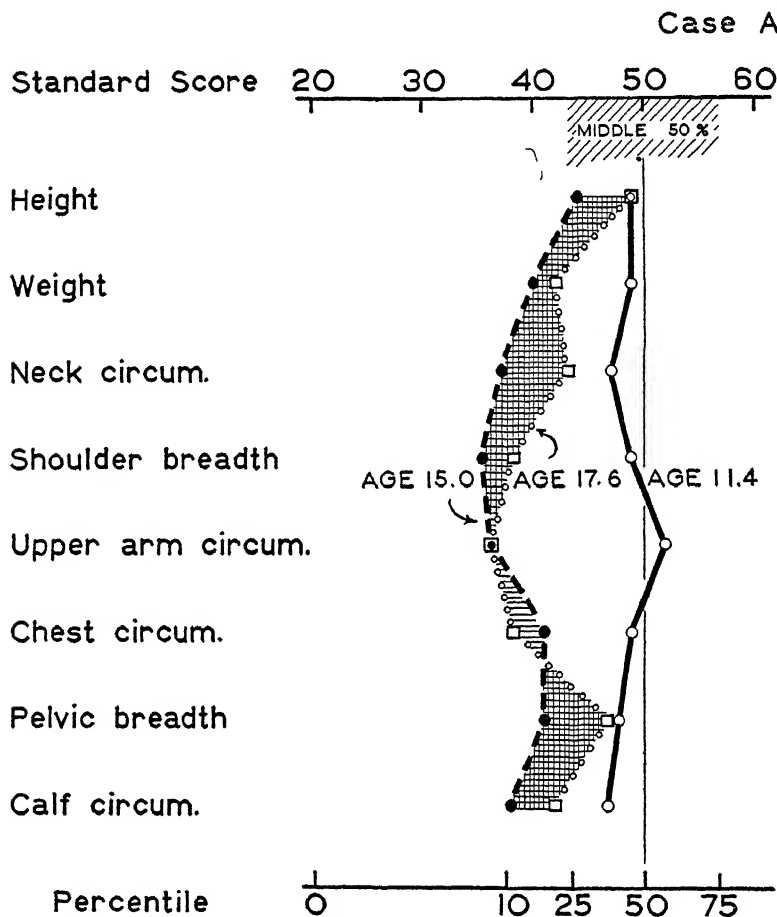


FIG. 7.—Age changes in relative size.

body develop according to unpredictably different time schedules, with resulting shifts in body build. This is illustrated in Figure 7, which presents one boy's deviations from the group average in eight measurements shown in profiles for three different ages, the various measurements being rendered comparable in terms of standard scores.⁵ At

⁵ In this figure, as in Figures 10 and 11, the group mean for a given age and sex is represented by a score of 50; the standard deviation, in terms of these units, is held constant at 10.

eleven years he was close to the average (50) in all measures and thus had fairly typical body proportions at this age. He was, however, exceptionally slow in maturing and at fifteen years lagged far behind the average, especially in shoulder breadth and in girths of neck, arm, and calf. With delayed sexual maturing, his recovery toward the average at 17.6 years was very irregular; although returning to his eleven-year position, close to the average, in height and pelvic breadth, he still lagged far behind in some of the other measurements, even losing

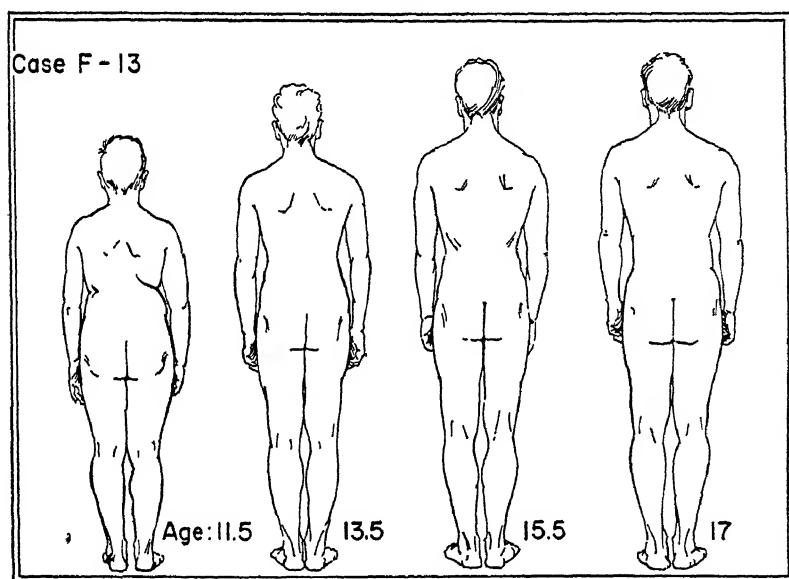


FIG. 8.—An example of change in body build.

position in chest girth. A further typical feature is that, although slow in maturing, his shoulders remained exceptionally narrow.*

Figure 8 illustrates another case of a boy whose body proportions changed during adolescence. From a narrow-shouldered, broad-hipped, "endomorph" fat boy of 11.5 years, he developed broad, thick shoulders by 17 years, with relatively narrow hips, and with a more muscular, "mesomorph" appearance.

Summarizing the findings from these anthropometric data, we find a number of differences in the patterns of growth and of build between

* This boy's physical development, in relation to psychological traits, is discussed in Jones (7).

boys and girls, and between individuals who show different rates of maturing. For both sexes the faster maturing children have more in-

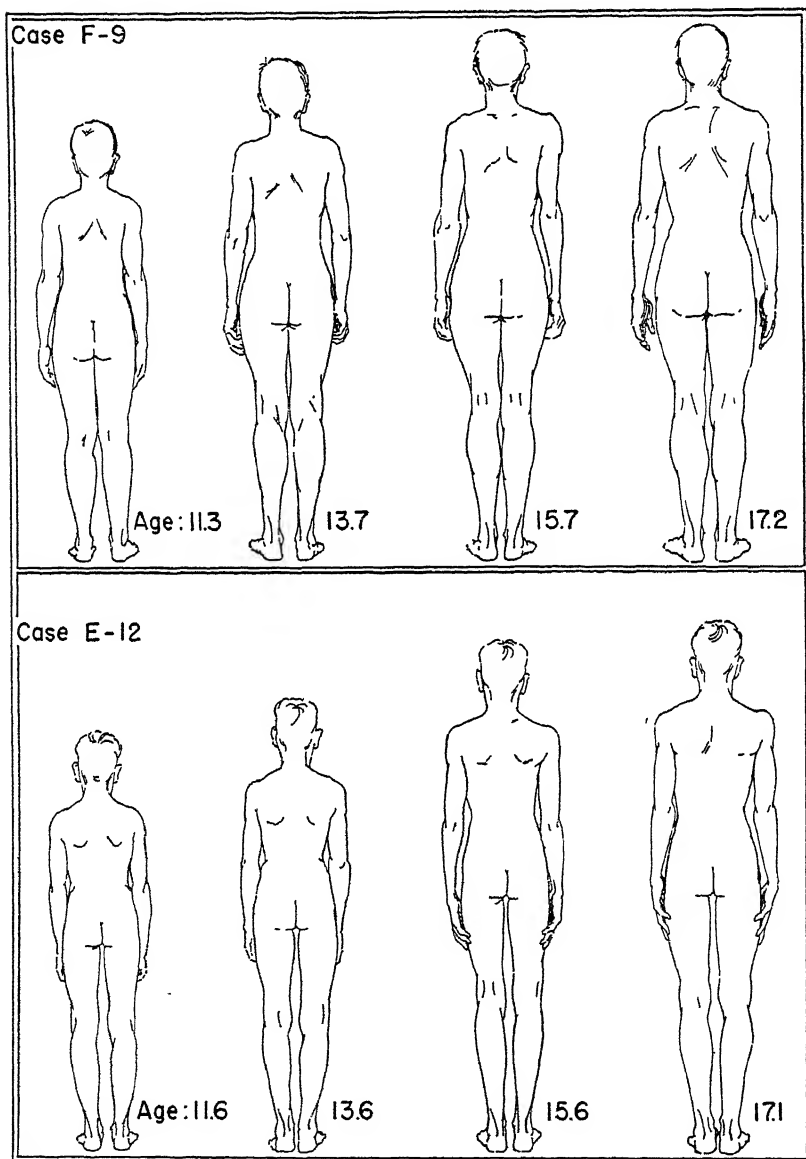


FIG. 9.—Comparison of growth changes in an early- and a late-maturing boy.

tense spurts of rapid growth, with the period of acceleration both starting and stopping abruptly, while the late maturers have less intense

periods of acceleration and with a subsequent growth which is longer continued, more even, and gradual. Boys who mature early tend to be large at all ages, especially so during the accelerated phase; as previously noted they are also usually broad built with relatively wide hips. Observation of photographs coupled with other measures not discussed here indicates that this picture carries further in that they are generally heavy-set. According to the cephalic indices presented by Shuttleworth (23), they also have broader heads. Late-maturing boys, on the other hand, are more likely to be long-legged and slender, to have a "linear" or "asthenic" build, and to be narrow-headed. The late maturers are relatively small around 13 and 14 years, when their spurt of rapid growth is not yet started, but they grow up to be average or tall adults. These contrasting builds are illustrated in fairly typical fashion in the outline drawings (Figure 9) of a late-maturing boy, E12, at four ages, and an early-maturing boy, F9, at the same ages. The anthropometric dimensions of these boys at these ages are shown in Table I, and their growth curves, in standard scores, are included among those presented in Figure 10. E12 is long-legged,

TABLE I.—MEASURES OF AN EARLY-MATURING BOY (F9) AND A LATE-MATURING BOY (E12) AT FOUR AGES

Measure	Subject F9				Subject E12			
C. A.	11.3	13.7	15.7	17.2	11.6	13.6	15.6	17.1
Weight (lb.)	104.9	134.7	141.3	150.8	79.6	93.0	120.8	140.6
Height (in.)	60.6	68.0	71.1	71.5	58.0	61.6	67.9	72.0
Stem Length	31.1	34.5	36.8	37.0	28.3	29.7	33.0	35.9
Bi-iliac	9.8	11.0	11.4	11.6	8.9	9.6	10.4	11.0
Biacromial	12.7	14.0	15.0	15.7	12.0	12.6	13.9	15.3
Stem Length .....	.514	.508	.519	.518	.489	.483	.485	.499
Height								
Bi-iliac .....	.161	.162	.160	.163	.156	.155	.155	.153
Height								
Bi-iliac .....	.787	.787	.758	.741	.756	.758	.752	.745
Biacromial								

with a long slender neck, and generally small transverse dimensions, but with square shoulders which do not appear at all narrow for his build. A typical late maturer, he is slow in gaining his adult height. F9, on the other hand, is broad in all transverse dimensions, with wide hips, and his body contributes more to his total height. He has grown up fast and is relatively much larger at the younger ages.

Additional comparisons are offered in Figure 10, which presents

individual height curves for seven boys who were the earliest maturing and seven who were the latest maturing (in terms of skeletal age), in a

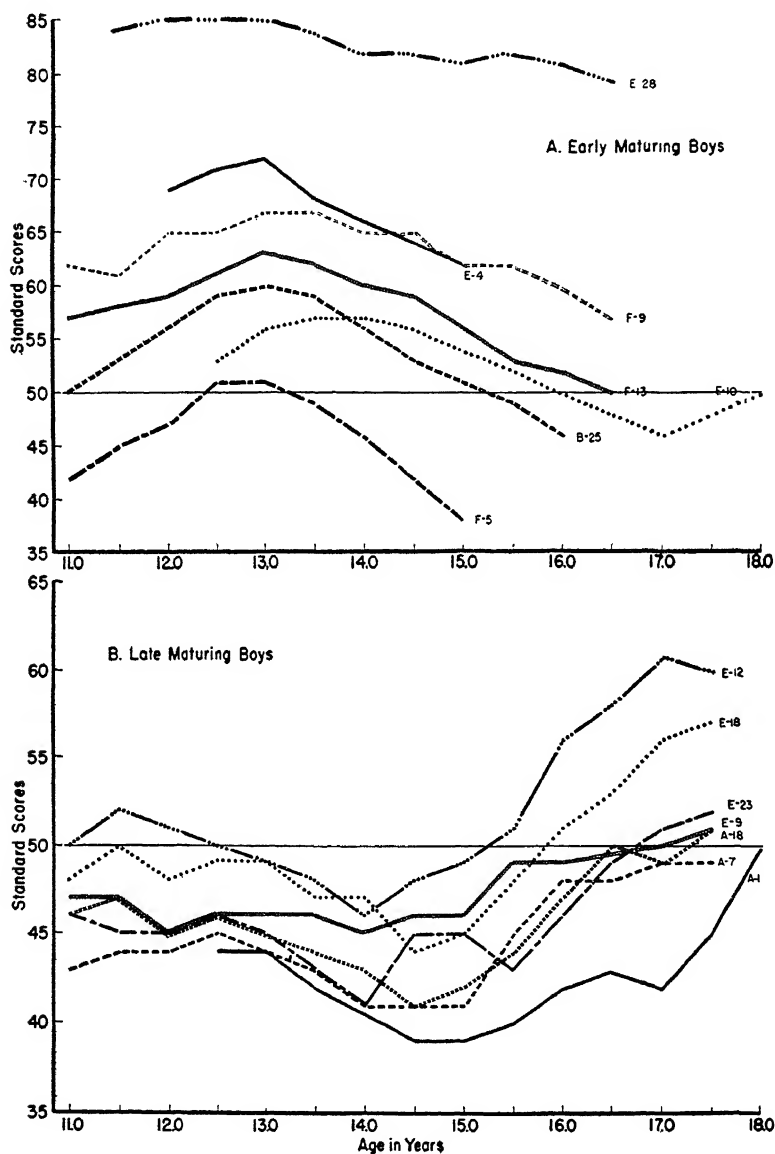


FIG. 10.—Individual curves in standard scores (height). (From Bayley.)

total group of ninety boys from the California study. These height curves are based on standard scores (see footnote, p. 44). In standard

score units, an individual who maintains his relative position in the group will have an age curve which is horizontal, and parallel (either above or below) to the group average at 50. A rising curve indicates that a boy is growing taller relative to his classmates of the same chronological age; a falling curve indicates that he is losing position and becoming shorter relative to the group as a whole. From Figure 10A it can be seen that early-maturing boys tend to gain in relative height up to the age of about 13, and to lose in relative height after that age. The changes are considerable in extent; F5, for example (the lowest curve in Figure 10A), has a standard score of 43 at age 11, placing him approximately at the 25 percentile for his age group. In the next two years, however, he overtakes many of his classmates, rising to an average position. That this is only a temporary gain is shown by the remainder of the curve, which in the following two years drops to a standard score of 38, or below the 15 percentile of his group. Such relatively rapid changes in status are often accompanied by social and psychological effects of considerable moment (see chapter v, and reference 7). Figure 10B presents an opposite picture for late-maturing boys, who tend to lose ground (in relative height) up to the age of 14 or 15, and thereafter show gains which in some cases are almost spectacular. Case E12, for example, (the top curve in 10B; see also Figure 9 and Table I) is quite definitely below the group average at 14, but three years later he has reached a position in the tallest 15 per cent of the group. With regard to their adult stature, both early- and late-maturing boys tend to be average or above average at the end of adolescence.⁷

Figure 11 compares the growth patterns (in standard scores) of early- and late-maturing girls. As in the case of boys, the former tend to be tall at the time of their peak of growth, but unlike early-maturing boys their adult stature is, in general, shorter than the average. Late-maturing girls are in the majority of cases distinctly taller than the average. In *body proportions*, however, few differences can be noted between the two groups. The greater distinctions in body build which are apparent among early- and late-maturing boys may indicate that during the period of most rapid growth they are more susceptible than girls to the influence of differentiating hormonal factors. Some support may also be given to the hypothesis that the female sex hormones are

⁷ This is not clearly apparent in the particular cases shown in 10A, which present a fairly wide scatter from tall to short. Evidence from larger groups, however, (see Figure 5, chapter ii) supports the statement that early-maturing boys are not only taller than the average during adolescence, but to a lesser degree they retain this superiority as adults.

more potent than the male sex hormones in terminating physical growth, as suggested by the fact noted above that early-maturing girls

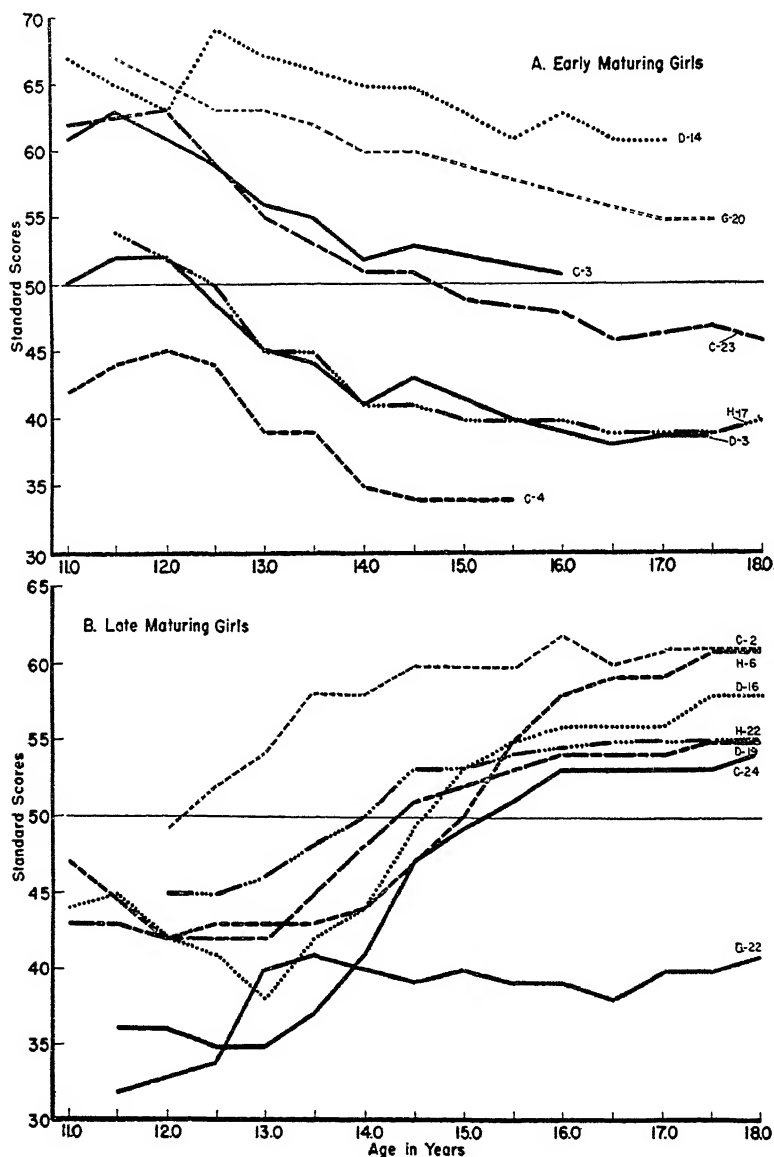


Fig. 11.—Individual curves in standard scores (height). (From Bayley.)

reach a subaverage adult height, whereas early-maturing boys tend to be as tall or taller than the average.

IV. BUILD AND TEMPERAMENT

It was mentioned at the beginning of this chapter that one of the primary interests in studying body build has been to try to discover relationships to temperament and other variations in personality. Much of this work has been done with pathological cases among adults; a typical classification is that of Kretschmer's (12). Asthenics or slender-built persons are described as having a tendency toward withdrawn personalities; in case of mental disease, their characteristic aberration is in the direction of schizophrenia. Broad-built pyknics, on the other hand, are described as more volatile and outgoing individuals, often passing through cycles of elation and depression, and (if mentally disturbed) with tendencies toward manic-depressive psychoses. While studies of pathological cases (in mental hospitals) have given some support to Kretschmer's theory, the assumed relationships between build and temperament are less easy to demonstrate within normal samples. An illustration of such a study is that of Klineberg, Asch, and Bloch (11), who selected college students with extreme "pyknic" and "leptosomic" builds, as determined by anthropometric measurements. These students were given a series of intelligence and personality tests, but in none of the tests were the two groups found to be significantly different. The relation of build to intelligence has also been found by various investigators to be of little or no significance (1, 8, 16).

Sheldon's studies represent a very different approach to this problem. Paralleling the tripolar classification of physical structure (described on pp. 35-38), he has described three dimensions of temperament. The first, *viscerotonia*, "is characterized, in its extreme manifestation, by general relaxation, love of comfort, sociability, conviviality, gluttony for food, for people, and for affection." The second, *somatotonia*, "is roughly a predominance of muscular activity and of vigorous bodily assertiveness." The third, *cerebrotonia*, is principally characterized by "the element of restraint, inhibition, and of the desire for concealment. Cerebrotonic people shrink away from sociality. . . . Their behavior seems dominated by the inhibitory and attentional functions of the cerebrum" (20: 10). The rating of an individual on a seven-point scale for each primary dimension yields a three-digit *index of temperament* analogous to the numerical somatotype assigned in the physical domain. There are, in addition, certain other secondary variables, (sexuality, intelligence, etc.) which are rated separately to afford a more complete description of the personality.

Sheldon has reported a marked similarity between ratings of morphological dimensions and the corresponding temperamental qualities.

For his principal experimental group of two hundred men, all of whom were college students or college graduates and between the ages of 17 and 31, he found a correlation of .79 between ratings of viscerotonia and of endomorphy; of .82 between somatotonia and mesomorphy; and of .83 between cerebrotonia and ectomorphy. Thus, these researches yield a surprisingly exact confirmation of the folk-belief that fat people are good-natured, loving people and food; that muscular people are aggressive, noisy, and inclined toward violent physical exercise; that thin people are tense, restrained, and more inclined toward intellectual interests than toward social intercourse or muscular activity. Although only fourteen of the two hundred cases were assigned indices of temperament which exactly coincided with their somatotypes, there were only eleven cases in which there was a discrepancy on any one of the components as large as two rating-scale points. This degree of relationship between temperamental and physical characteristics is so much closer than that reported by other investigators that Sheldon's rating procedure demands critical scrutiny.

The ratings of physiques were derived from a combination of inspectional and measurement criteria applied to standardized photographs and seem to represent a reasonably objective technique.

The ratings of temperament were presumably based on observations and on at least "twenty analytic interviews" (20: 27) extending over the period of a year. It is difficult to gauge the adequacy of the material thus secured. The fact that the same observers assessed both temperament and physique, suggests that a "halo effect" may have operated to some extent to increase the degree of correspondence in these judgments. The final rating of each component of temperament constitutes the average of ratings obtained for twenty traits subsumed under that component. Of the twenty items in each of the three lists, only five possess polar antitheses on each of the remaining lists, a situation which makes it difficult to believe that temperamental variations are tripolar in any very fundamental sense. It is statistically desirable to isolate as many as possible of the characteristics of temperament which can be correlated with morphological dimensions. However, inspection of the lists of traits suggests that the goal of defining sixty items has been achieved partly by rating separately variables which overlapped markedly in meaning, and partly by including rather minor aspects of temperament (e.g., response to alcohol) because they happen to be conveniently divisible into three mutually antithetical expressions. Furthermore, many important dimensions of temperament seem to have been omitted altogether. In spite of these

inadequacies, the implications of the results are sufficiently provocative to warrant further careful study by independent workers.

The few studies in which physique and temperament are compared in adolescents are primarily concerned with differences in maturity rather than with body build as such. Stone and Barker (25, 26), for example, have found differences in the interests and attitudes of premenarcheal as compared with postmenarcheal girls and have concluded that physical maturity has considerable influence on some aspects of psychological maturity among adolescents.

In the California study a similar comparison has been made between those maturing early and those maturing late (2, 5) but with the discovery of only slight differences, on the average, in behavior and attitudes. Such differences as were found seem to corroborate the thesis presented in chapter v (p. 87), namely, that being different from their peers seemed to be a potential hazard to adequate adjustment. The poorest adjusted among the four extreme groups were the early-maturing girls and the late-maturing boys. As these children attended a coeducational school in which grade placement was largely by chronological age, the two groups who would stand out in the school-room as physically most different would be the large, early-maturing girls and the small, late-maturing boys. To be a girl and large, and to be a boy and small, are both contrary to the ideals of the culture, and therefore it seems plausible to expect that some of these children, if they do not have adequate compensations in other fields, might well find their physical difference an emotional problem. Of interest in this connection is Sheldon's statement (19: 239) that certain dysplasias or disharmonies in development in different body regions, especially a tendency toward the morphological characteristics of the opposite sex, were conspicuously more common among three thousand young schizophrenics than among the general population.

With the exception of Sheldon's studies, most of the recent researches on temperament and body build have revealed little or no relationship between the two. However, there is evidence that the changes of build in the growing child, and his physical deviations from the average, may become important for him emotionally. The adult who deals with children at these ages can do much to help such children to accept and adjust to their physiques.

REFERENCES

1. ABERNETHY, E. M. *Relationships between Mental and Physical Growth*. Monographs of the Society for Research in Child Development, Vol. I, No. 7. Washington: National Research Council, 1936. Pp. 80.

2. BAYLEY, N. "Body Build in Adolescents Studied in Relation to Rates of Anatomical Maturing, with Implications for Social Adjustment," *Psychological Bulletin* (abstract), XXXVIII (1941), 378.
3. ———. "Size and Body Build of Adolescents in Relation to Rate of Skeletal Maturing," *Child Development*, XIV (1943), 47-90.
4. ———. "Skeletal Maturing in Adolescence as a Basis for Determining Percentage of Completed Growth," *Child Development*, XIV (1943), 1-46.
5. BAYLEY, N., and JONES, M. C. "Some Personality Characteristics of Boys with Retarded Skeletal Maturity," *Psychological Bulletin* (abstract), XXXVIII (1941), 603.
6. GREULICH, W. W., and OTHERS. *A Handbook of Methods for the Study of Adolescent Children*. Monographs of the Society for Research in Child Development, Vol. III, No. 2. Washington: National Research Council, 1938. Pp. 406.
7. JONES, H. E. *Development in Adolescence*. New York: D. Appleton-Century Co., Inc., 1943. Pp. xvii + 166.
8. ———. "Relationships in Physical and Mental Development," *Mental and Physical Development*, pp. 91-102. Review of Educational Research, Vol. IX, No. 1. Washington: American Educational Research Association, 1939.
9. ———. "The Adolescent Growth Study: I. Principles and Methods; II. Procedures," *Journal of Consulting Psychology*, III (1939), 157-59, 177-80.
10. KELLEY, H. J. and REDFIELD, J. E. "Physical Growth from Birth to Maturity," *Growth and Development*, pp. 573-91. Review of Educational Research, Vol. XI, No. 5. Washington: American Educational Research Association, 1941.
11. KLINEBERG, O.; ASCH, S. E.; and BLOCK, H. *An Experimental Study of Constitutional Types*. Genetic Psychology Monographs, Vol. XVI (1934), pp. 140-221.
12. KRETSCHMER, E. *Physique and Character*. (W. J. H. Sprott, trans.) New York: Harcourt Brace & Co., 1925. Pp. 266.
13. KROGMAN, W. M. *A Bibliography of Human Morphology, 1914-1939*. Chicago: University of Chicago Press, 1941. Pp. 285.
14. MEREDITH, H. V. "Physical Growth from Birth to Maturity," *Mental and Physical Development*, pp. 54-84. Review of Educational Research, Vol. VI, No. 1. Washington: American Educational Research Association, 1936.
15. ———. *The Rhythm of Physical Growth*. University of Iowa Studies in Child Welfare, Vol. XI, No. 3. Iowa City, Iowa: State University of Iowa, 1935. Pp. 128.
16. PATERSON, D. G. *Physique and Intellect*. New York: Century Co., 1930. Pp. 304.
17. PRYOR, H. B. "Certain Physical and Physiological Aspects of Adolescent Development in Girls," *Journal of Pediatrics*, VIII (1936), 52-64.
18. RICHEY, H. G. *The Relation of Accelerated, Normal, and Retarded Puberty to the Height and Weight of School Children*. Monographs of the Society for Research in Child Development, Vol. II, No. 1. Washington: National Research Council, 1937. Pp. 67.

19. SHELDON, W. H.; STEVENS, S. S.; and TUCKER, W. B. *The Varieties of Human Physique*. New York: Harper & Bros., 1942. Pp. xii + 347.
20. SHELDON, W. H. (with the collaboration of S. S. STEVENS). *The Varieties of Temperament: A Psychology of Constitutional Differences*. New York: Harper & Bros., 1942. Pp. x + 520.
21. SHUTTLEWORTH, F. K. *Sexual Maturation and the Physical Growth of Girls Age Six to Sixteen*. Monographs of the Society for Research in Child Development, Vol. II, No. 5. Washington: National Research Council, 1937. Pp. 253.
22. ———. *Sexual Maturation and the Skeletal Growth of Girls Age Six to Nineteen*. Monographs of the Society for Research in Child Development, Vol. III, No. 5. Washington: National Research Council, 1938. Pp. 56.
23. ———. *The Physical and Mental Growth of Girls and Boys Age Six to Nineteen*. Monographs of the Society for Research in Child Development, Vol. IV, No. 3. Washington: National Research Council, 1939. Pp. 291.
24. SIMMONS, K. and GREULICH, W. W. "Menarcheal Age and the Height, Weight, and Skeletal Age of Girls Age Seven to Seventeen Years," *Journal of Pediatrics*, XXII (1943), 518-48.
25. STONE, C. P. AND BARKER, R. G. "On the Relationship between Menarcheal Age and Certain Measurements of Physique in Girls of the Ages Nine to Sixteen Years," *Human Biology*, IX (1937), 1-28.
26. ———. "On the Relationships between Menarcheal Age and Certain Aspects of Personality, Intelligence, and Physique in College Women," *Journal of Genetic Psychology*, XLV (1934), 121-35.
27. TODD, T. W. *Atlas of Skeletal Maturation (Hand)*. St. Louis: C. V. Mosby Co., 1937. Pp. 303.
28. ———. "The Roentgenographic Appraisalment of Skeletal Differentiation," *Child Development*, I (1930), 293-310.

CHAPTER IV

PHYSIOLOGICAL CHANGES IN ADOLESCENCE

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I. PHYSIOLOGICAL CHANGES AND BEHAVIOR

When G. Stanley Hall wrote his imposing volumes on adolescence nearly forty years ago (12) scant attention was being given to the physiological aspects of adolescent growth. The chief reason for this omission was that physiologists of that time had not yet discerned the significant differences between adolescents and adults with respect to the physiological functioning of the organism. Just as pediatricians have discovered that the young child is not simply a miniature adult, so students of human development have come to the realization that the adolescent is neither child nor adult in his physiological reactions. In the adolescent many new physiological adjustments are being made which were unnecessary in the young child and which become stabilized in the adult. Thus, adolescence may be regarded as a period of physiological "learning." As an example, the regulation of body temperature may be cited. The rather wide fluctuations in body temperature observed in young children give way to a more stable regulation of temperature by the beginning of the second decade. Thus, the growing organism has "learned" to utilize and co-ordinate the numerous mechanisms involved in temperature control. Another example of such physiological learning is the regulation of menstrual periodicity. When menstruation first begins in adolescent girls it does not usually recur at uniform intervals. However, over a period of several years the physiological factors involved in menstruation become better co-ordinated and a greater regularity of interval is established. The individual organism has learned to maintain the even, homeo-

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static adjustment¹ of the adult upon which certain physiological rhythms, such as that of menstruation, may be superimposed. As a result of such learning, physiological fluctuation is reduced and the uniformity of the adult state is attained.

To those concerned with the direction and guidance of adolescents, this period of development often seems burdened with a multitude of problems. Most of these problems are associated with the adjustments which the adolescent is called upon to make to an environment dominated by adults at a time when his own internal environment is in a state of flux. The unpredictable variations in the adolescent's behavior, so exasperating to adults, may often have a physiological basis. One example is the stirring of sexual instincts, resulting from the increased production of sex hormones within the adolescent's own body and giving rise to typically "adolescent behavior" which is often at odds with the standards set by adults. Until the individual can reconcile his own internal environment with his social and cultural environment, some degree of conflict and psychological turmoil will likely prevail.

Another source of psychological tension and anxiety to adolescents is the great difference in rate at which different individuals approach maturity. When Jimmy's pal, Johnny, suddenly surpasses him in height and begins to shave, Jimmy may wonder whether he himself is "normal." As the discrepancies between his appearance and that of his associate become more prominent, he becomes increasingly anxious about his developmental status. It is not surprising that, in order to prove himself, he sometimes resorts to behavior which is far from socially acceptable to adults.² On the other hand, the rapidly maturing adolescent may find himself in hot water because adults expect from him behavior or performance consistent with his size. Since size and maturity do not necessarily proceed together, it often happens that the "large" adolescent is relatively immature. Thus, he may be unable to meet the expectations of adults with respect to performance or behavior. The failure to "deliver" in the eyes of his peers or of adults is a not uncommon source of psychological tensions. It is quite probable that in many an adolescent the inadequacy which he feels or observes has a definite physical or physiological basis, but the nature

¹ The term "homeostasis" was introduced into physiology by Cannon (4) to draw attention to the essential constancy of the chemistry of the body and the numerous mechanisms which maintain it.

² A case study of a physically and physiologically retarded boy has been reported in some detail by Jones (20). Other types of developmental discrepancy are discussed in chapter v of this volume.

of the originating or contributing factors may vary widely among different individuals.

The problem of assessing physiological maturity in adolescents is one of the chief concerns of the present chapter. All too often children and adolescents suffer from the "tyranny of the norm" as imposed by adults. The fact that the average weight of fourteen-year-old boys is 110 pounds does not mean Johnny should weigh 110 pounds at the age of fourteen. It will never be known how many gallons of unwanted milk have been poured down the throats of resisting children simply because they were a few pounds under the average weight for their age groups. It is therefore with some misgivings that average curves for many physiological measures are presented here. Our hope, however, is that reference to the wide individual differences in rates of development among children will temper the acceptance of mean values and emphasize the extent to which many adolescents may depart from such mean values while still remaining within a "normal" range.

In contrast to the easily observed physical characteristics of height, weight, and body form, special apparatus and special techniques of measurement must be applied in the assessment of physiological maturity. For instance, the basal metabolic rate is an important physiological variable which cannot be directly and simply observed but requires laboratory procedures for its measurement. Furthermore, the results obtained from most physiological measurements are influenced by a large number of conditions, such as the body position assumed by the subject when the measurements are made, the length of time elapsing between previous activities such as eating, sleeping, or exercising, and the time of day when the measurements are made. Thus, if reliable and interpretable results are to be obtained, careful control must be established over the activities of the subject for twelve to fourteen hours prior to measurement, as well as over the conditions prevailing at the time of measurement. As a result of these technical difficulties, physiological studies of children and adolescents are less numerous than studies dealing with height, weight, and other anthropometric measurements.

It is the aim of the present section to illustrate the methods that can be used in determining the physiological maturity of adolescents and to discuss such data as are available concerning individual differences in the rate at which adolescents mature. Information of this character is essential if we wish to assess the potential importance of physiological factors in adolescent behavior.

II. GROWTH TRENDS IN PHYSIOLOGICAL CHARACTERISTICS AT ADOLESCENCE

The general nature and direction of age changes in height and weight are apparent to even casual observation. This, however, is not the case for many of the physiological changes in adolescence. Some measurements increase with age while others decrease. For example, among boys, blood pressure rises with age while basal metabolism decreases. We must not merely know the special characteristics of various growth curves but it is also necessary to find out just what constitute adult levels for many of the physiological functions observed, and to

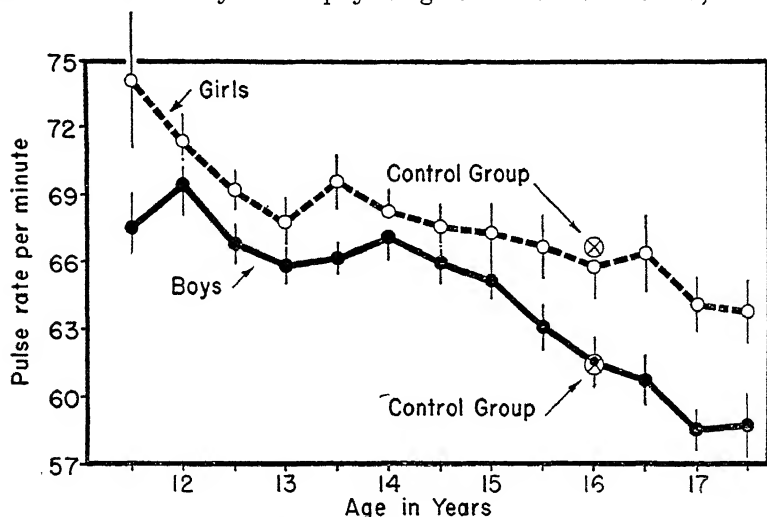


FIG. 1.—Age changes in basal pulse rate.

determine the general sequence of maturation of different functions. It is only against such a background of average growth curves that the importance and significance of individual variations can be understood.

Figure 1³ shows the average pulse rate of boys and girls taken under basal physiological conditions,⁴ as a part of the Adolescent Growth

³In this and in other figures the vertical lines through each point indicates ± 1 S. D. mean. Values are also indicated for outside "control groups" of boys and girls, tested at age 16 in order to permit a comparison between subjects with numerous previous measurements and a new sample without earlier experience in these laboratory procedures.

⁴"Basal conditions" means in this case that measurements were made 12-14 hours after the last meal. The period of measurement was preceded by a 20-minute period of rest in the recumbent position. Basal conditions as defined above constitute a necessary physiological standardization, which has, however, been met in only a few of the studies of physiological changes in human development.

Study at the University of California. In this study (42), measurements were made on the same fifty girls and fifty boys at six-month intervals between the ages of 11.5 and 17.5 years. These curves show an average decrease of eight to nine beats per minute for both boys and girls over the adolescent period. The rate for girls is from two to six beats per minute faster than for boys at all ages. This sex difference in pulse rate increases somewhat with age. The slight rise in pulse rate observed in girls between the ages of 13 and 13.5 years is not statis-

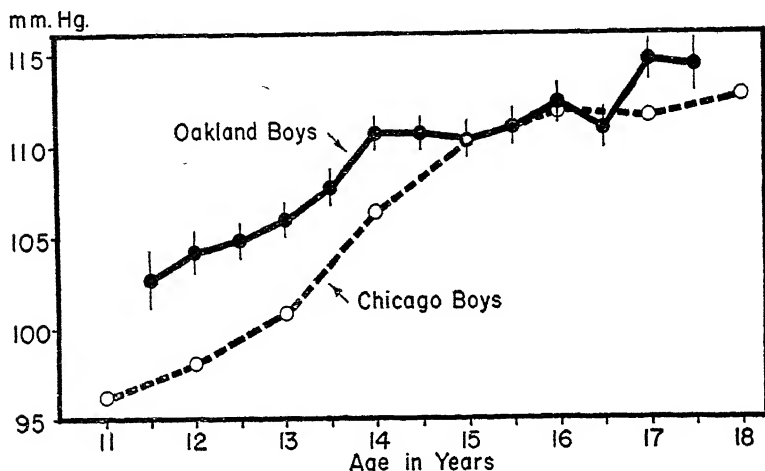


FIG. 2.—Age changes in systolic blood pressure.

tically significant when averages are calculated on the basis of chronological age, but when girls are grouped on the basis of physiological maturity (estimated from the age at which menstruation first appeared) evidence can be noted for a rise in pulse rate just prior to the menarche or beginning of menstruation (see Fig. 11, p. 71).

In contrast to the gradual decrease in average pulse rate shown in Figure 1, the average systolic blood pressure rises with age. This is shown in Figure 2, which presents data obtained on two series of boys.⁵ The corresponding curves for girls show less-marked changes during adolescence. Before the age of 13.5, systolic blood pressures of boys and girls do not differ significantly, but after this age the pressure rises in boys at a more rapid rate than in girls, so that a significant

⁵ As a part of the California study (42), measurements of the Oakland boys were of the same subjects at each age; the blood pressure records were obtained under basal conditions (supine). The Chicago study (33) involved different cases at each age; measurements were made after a short rest period (sitting). In both studies, age trends were less marked in diastolic than in systolic blood pressure.

sex difference becomes established. The lower blood pressure of girls in late adolescence may be a factor which contributes to their reduced physical performance and activity during this period (cf. chapter vi, and reference 7).

In contrast to the rising curves of average blood pressure, the basal metabolism⁶ decreases with age. Figure 3, from the California study (41), and Figure 4, from Boothby and Sandiford (2), illustrate the changes in basal metabolism expressed in units of heat production per unit of body surface area.⁷ These charts show that the average basal metabolism decreases gradually throughout the adolescent period. For girls, the rate of fall of basal metabolism has become very small by the age of 17 years, so we may assume that on the average the values attained at this time are close to adult levels. In boys, however, the basal metabolism continues to decrease even beyond the age of 18 years, thus offering additional evidence of the earlier maturity in girls than in boys.

While these curves demonstrate that in general a fall in basal metabolism is characteristic of the adolescent period, they provide us with no basis for predicting the pattern of age changes in individual boys and girls. As a matter of fact, only ten out of one hundred cases in this study exhibited the uniform, even decrease characteristic of the average curves; over half of the subjects showed periods of very rapid change, as illustrated in Figures 5 and 6. Because these periods of rapid change fall at different ages in different subjects, distinctive patterns are lost in the process of averaging. A few subjects revealed an

⁶The basal metabolism or basal oxygen consumption indicates the amount of energy required to maintain the normal vital processes of the individual when in the "basal" state (see footnote p. 59). It has been found that this basal energy requirement is closely associated with the functional activity of the thyroid gland. When the thyroid gland is underactive the basal metabolism is reduced. In measuring basal metabolism, the subject breathes through a mask or mouthpiece so that the expired air can be collected in a large rubber bag or tank. The volume of air expired in an eight-minute period is measured and part of it analyzed for its oxygen and carbon dioxide content. Since the amount of oxygen present in the outdoor air which was breathed by the subject is known, the reduction in the oxygen content of the expired air represents the amount of oxygen consumed by the subject in the eight-minute period. For technical details of the method see Boothby and Sandiford (1) and Peters and Van Slyke (32).

⁷In considering age changes in basal metabolism it is necessary to make some correction for differences in body size, since a large individual will require more oxygen simply because he has more tissue which demands oxygen for its maintenance. It is customary to allow for size by expressing all results in terms of the surface area of the subject, which is computed by a formula based on height and weight (6).

age trend opposite to the average, that is, an increase in basal metabolism with age. These subjects, five in number, tended to be small,

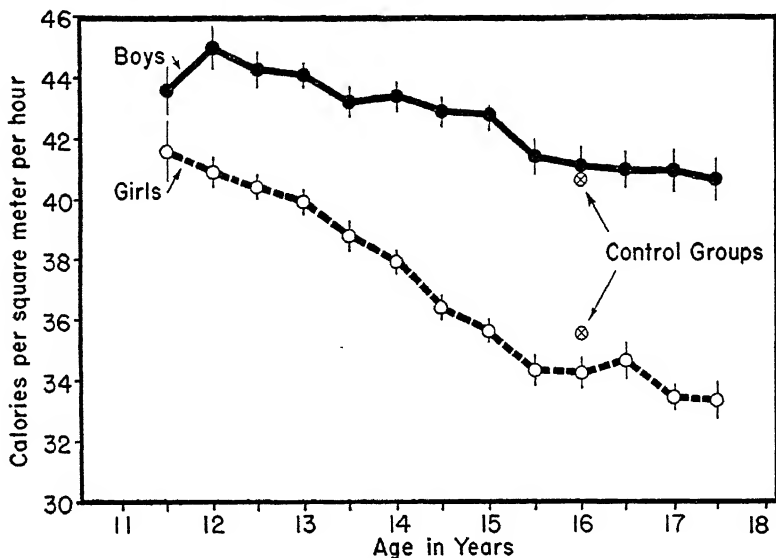


FIG. 3.—Age changes in basal metabolism (repeated tests on same subjects). (Smoothed data.)

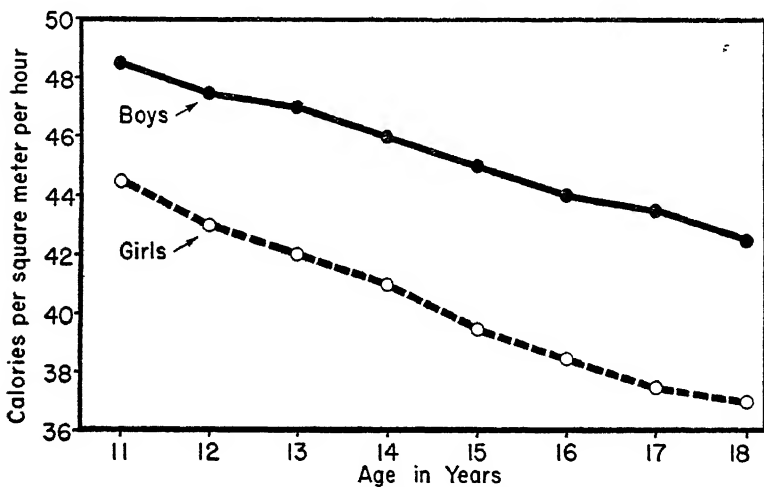


FIG. 4.—Age changes in basal metabolism (different subjects at each age). (After Boothby and Sandiford.)

slow-maturing, and physiologically unstable individuals (as shown by the lack of close agreement between measurements of metabolism

made on successive days). They were also frequently marked by atypical social behavior.



FIG. 5.—Individual growth curve of basal metabolism (boy).

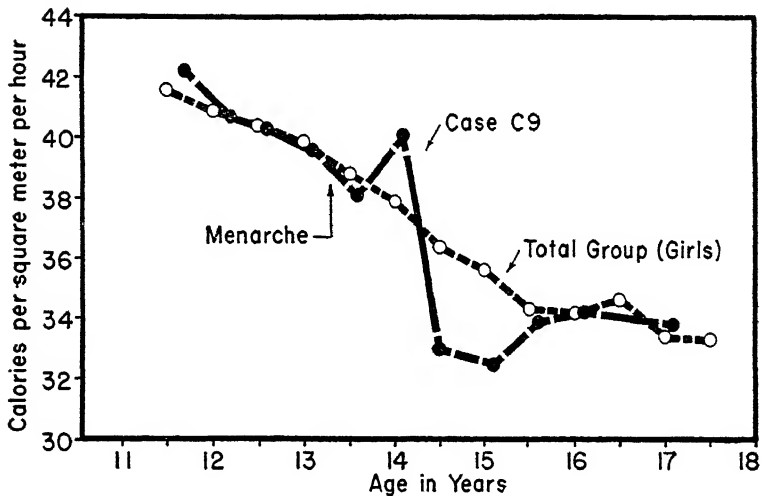


FIG. 6.—Individual growth curve of basal metabolism (girl).

Similar discrepancies between individual and average growth curves have been found for other physiological variables. Limitations of space

prevent their presentation in detail. However, as has been emphasized in other chapters, it is important to bear in mind that wide individual differences in patterns and rate of physiological development occur among so-called "normal" children, and that children of the same chronological age may be quite unlike in the degree of physiological maturity.

III. PHYSIOLOGICAL CAPACITIES

The previous section has been concerned with the physiological status of individuals under basal or resting conditions. In children and adolescents it is also important to know the capacity for physiological adjustment under conditions of stress. Physical exercise produces physiological stress which involves the heart, the circulation, the muscles, and respiration. In the present section our attention will be directed to (1) the changes produced within these various organ systems by exercise; (2) the rate at which recovery takes place after strenuous exercise; and (3) the total capacity for exercise at different age levels.

Although many investigations of "exercise tolerance" have been made with children and young adults, the California Adolescent Growth Study (19) is the only one in which the same children have been subjected to strenuous exercise under standard conditions in experiments repeated through a period of years. Hence most of the data on age changes in recovery from exercise must be drawn from this study. The imposed exercise involved climbing four flights of stairs (to a height of 58.5 feet) as rapidly as possible. On reaching the top of the stairs, measurements were recorded for 30 to 45 minutes, while the subject was lying on a cot. These measurements included oxygen consumption, carbon dioxide production, volume of expired air, respiratory rate, pulse rate and both systolic and diastolic blood pressures.⁸ Figure 7 shows the changes in oxygen consumption, pulse rate, respiratory volume, and blood pressure following exercise in a typical experiment, the subject being a boy 14.5 years of age. As compared with measurements made immediately before climbing the stairs, the effect of exercise is to increase his respiratory volume and oxygen consumption to seven or eight times the basal requirements. In the ensuing rest period, however, the oxygen consumption falls rapidly and in from ten to fifteen minutes after exercise returns to a level only 15 to 20 per cent above the basal value. In younger children the oxygen consumption reaches basal levels within thirty to forty-five minutes; however, as they grow older more time is required for recovery. The

⁸ The apparatus for this experiment is described in (43).

recovery curve for respiratory volume is similar to that for oxygen consumption.

Exercise has a striking effect upon blood pressure, increasing the systolic and decreasing the diastolic levels.⁹ As seen in the illustrative case in Figure 7, during recovery these trends are reversed. Pulse rate, which has of course increased during exercise, falls rapidly during the first few minutes of recovery, but unlike the oxygen consumption, does not return to basal levels even after forty-five minutes of rest.

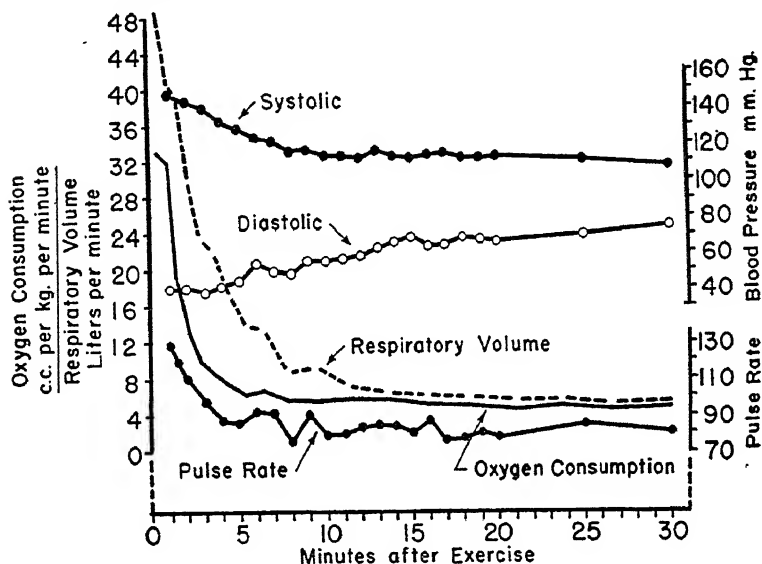


FIG. 7.—Physiological displacements and their recovery after exercise.

Figure 8 is based on computations of pulse rate one minute after the exercise described above. Here we see that pulse rate was increased more in girls than in boys at all ages. For both sexes, however, the increase after exercise is less as the children become older. Since increasing the pulse rate is one way in which more oxygen is brought to the working muscle, thus speeding its recovery, this diminished ability to raise the pulse rate is reflected in a slower rate of recovery from exercise as age increases. In old subjects, in whom both capacity for exercise and recovery are greatly diminished, pulse increments after exercises are relatively small (34).

⁹ The pressure of the blood within the arteries is not uniform, but changes with each heart beat. The maximum pressure attained at each heart beat is called "systolic pressure." The "diastolic pressure" is that which is maintained in the arteries during the period of dilatation and filling of the heart. The "pulse pressure" is the difference between the systolic and diastolic pressures.

In considering blood pressure changes, we have seen on p. 60 that under basal conditions the systolic pressure tends to increase with age, but that this increase is more rapid in boys than in girls. A sex difference is also apparent in the response to exercise, as shown in the degree to which the systolic pressure rises from basal levels. This rise becomes greater with age in the case of boys, and smaller with age in the case of girls—suggesting a possible physiological basis (at least in part) for adolescent sex-differences in athletic activity.

Especial interest attaches to the records for diastolic blood pressure; the speed of change in this function has sometimes been regarded

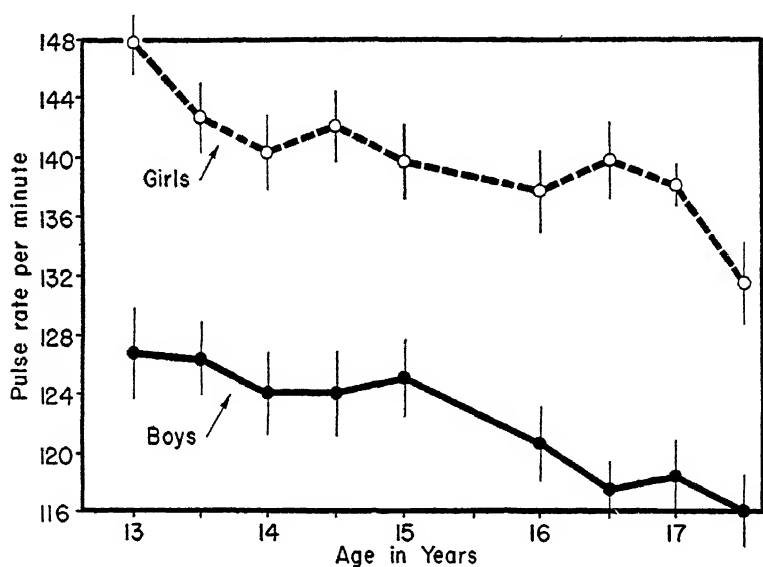


FIG. 8.—Mean pulse rate (one minute after exercise).

as an indicator of “vaso-motor reactivity.” Among younger boys the change following exercise is less rapid than among older boys,¹⁰ and by this criterion it would appear that vaso-motor lability increases and reaches a peak at around the age of 14-15 years (31). Sex differences are also apparent, in that at each age boys are more labile in this function than girls.

In the same experimental situation, the effect of the exercise upon oxygen consumption was to increase oxygen requirements on the av-

¹⁰ At 13 the maximum drop in diastolic pressure did not occur until five or six minutes after the end of exercise. When the same boys reached 14.5 the maximum drop occurred within two minutes.

erage about four and a half times for boys and five times for girls. Sex and age differences in mean oxygen consumption one minute after exercise are shown in Figure 9. Conspicuous differences at different age levels can also be noted in the rate of recovery to basal levels. While some of the younger adolescents returned to their normal rates within 20 minutes after exercise, college students and adults were found to require as long as three hours to effect the same degree of recovery. This decrease in recovery rate with advancing age is graphically shown in Figure 10, which represents age changes in a constant, symbolized as b , devised by Jenss and Shock (17) to quantify the recovery curves. The higher the value of this constant, the more rapid is the recovery rate. The curve shows a decrease in values of b for both girls and boys as age increases.

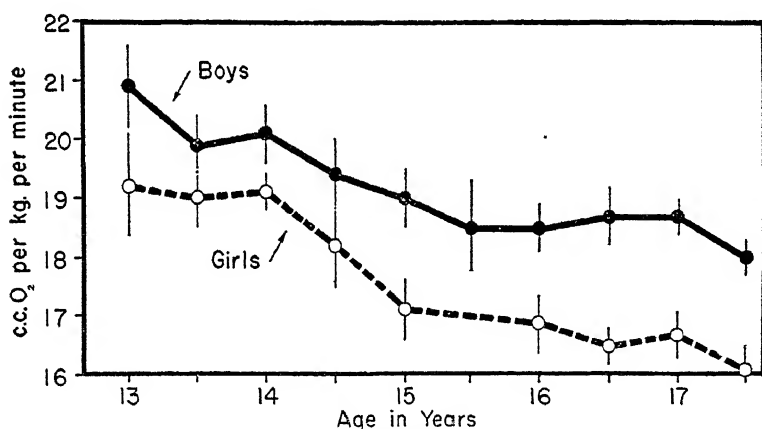


FIG. 9.—Mean oxygen consumption (one minute after exercise).

Since the rate of work and the total amount of work done increased as the children grew older (and hence heavier), the above statement must be interpreted with some caution. At each age with "all-out" exertion, recovery rate certainly diminishes. But since the capacity for doing work increases with age, and greater oxygen consumption results, we cannot yet be certain that part of the slower recovery in older subjects is not due to the greater displacement of their oxygen consumption. All such studies present a physiological dilemma, since if a constant amount of work at a constant rate is used in a developmental study, the exercise which may be maximal for the 12-year-old boy becomes mere child's play for the same boy when he reaches the age of 17. Master and Oppenheimer (25) have tried to meet this difficulty by determining the amount of work from which the subject will show

complete recovery of pulse rate within two minutes after the exercise of stepping on and off a 20-inch stool. Such a method offers two additional difficulties: (1) the accuracy with which "complete" recovery can be estimated and (2) the effect of prior tests on succeeding results when it is necessary to repeat the determinations on the same subject at short-time intervals. A more useful approach is that of Gallagher, *et al.*, who grade the amount of exercise on the basis of surface area (7). Unfortunately their method is devised for use with a bicycle ergometer and their results are not expressed in terms of standard units of work (kilogram-meters per unit time) which could be transferred to other forms of exercise, such as stepping on and off a stool of standard height.

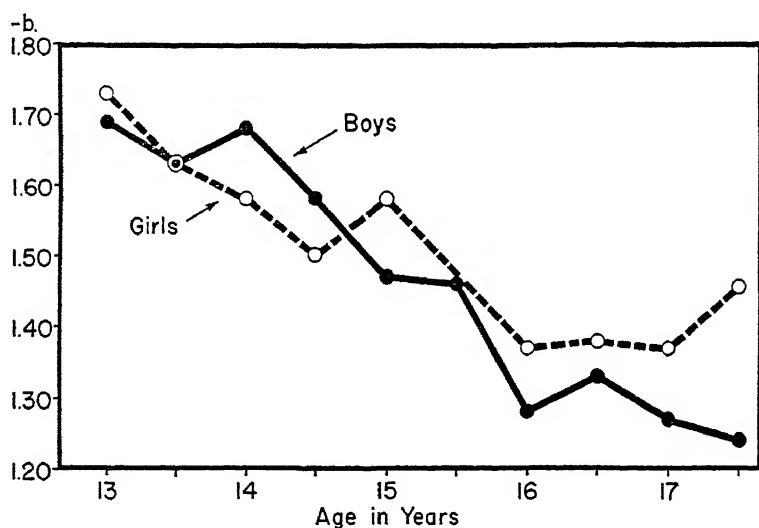


FIG. 10.—Rate of recovery in O_2 consumption after exercise.

In summarizing the findings from average curves we may say that as the adolescent grows older he shows less capacity to adapt to exertion by increasing his pulse rate. To compensate for this a higher systolic blood pressure must be maintained and more time is required for the return of oxygen consumption and pulse rate to basal levels.

Many tests have been devised for assessing "physical fitness," "capacity for exercise" or "exercise tolerance" (cf. reference 5). For this purpose changes in pulse rate and blood pressure produced by changes in posture, or the rate of recovery of blood pressure and pulse rate following a standard or uniform amount of exercise have been widely

used.¹¹ Reference to the pulse rate and blood pressure curves of Figure 7 indicates the difficulty of obtaining reliable estimates of pulse rate or blood pressure during the period of rapid changes immediately after exercise. Furthermore, many physiological variables, such as loss of sleep, eating, prior exercise, low-grade infections, and "colds," influence the score obtained on many of the tests of fitness, so that reliability coefficients tend to be low.¹² Recently workers at the Fatigue Laboratory of Harvard University (3, 18) have introduced a new test of fitness based on the recovery of pulse rate after exercise. The index of fitness derived from the results of this test is regarded by the authors as more reliable than earlier measures, and has been found particularly useful in assessing the results of physical training in adolescents and young adults (Gallagher, *et al.*, 8).

It may be said, however, that the perfect test of physical fitness has yet to be devised. Tests now in vogue suffer from the limitation of considering only one or two physiological aspects of recovery, such as pulse rate or blood pressure. Tests involving other measures, such as respiratory volume, oxygen consumption, blood lactic-acid content, oxygen content and saturation of the blood, may give a more accurate estimate of physical fitness, but the methods involve complicated apparatus and require time not available for many programs. Hence, less accurate methods that can be applied with a minimum of inconvenience to the subject and with a minimum of apparatus and special training on the part of the observer must suffice in practice. In comparing physical fitness and capacity for exercise among adolescents, the factor of size and degree of physiological maturity further complicates the situation so that much basic research remains to be done before we can say with certainty what degree of exertion and what kind of exercise may be safely indulged in by a specific child at a given age.

IV. ENDOCRINE ASPECTS OF ADOLESCENCE

*Since the attainment of sexual maturity is one of the central features of adolescence, many of the problems of adolescents have come to be regarded as primarily endocrine in character. In Dr. Greulich's chapter (p. 15) a résumé of these endocrine factors was presented, together with an account of their effects upon physical growth. Much of the evidence in this field rests upon studies of animals, and it is a moot question as to the extent to which the known results are applicable to humans. This is particularly true when we consider the effects of hormones in influencing behavior.

¹¹ See references 23, 37, 50, 51, 52.

¹² See references 15, 24, 27, 38, 49.

The gonads (ovaries or testes) of young, immature animals do not produce ova or spermatozoa. Nevertheless even immature animals show the production of small amounts of male or female sex hormones. With the advent of maturity ova are produced by females and sperm by males. Simultaneously an increase in the production of the appropriate sex hormone (male or female) is observed. The physiological stimulus to such maturation of the gonads is a hormone produced by the anterior lobe of the pituitary gland. This hormone of the pituitary is called the "gonadotrophic" hormone. Injection of extracts of this hormone will produce rapid sexual maturation in otherwise immature animals. As pointed out on p. 16, under the stimulus of the gonadotrophic hormone, the gonads (ovaries or testes) not only begin to produce mature ova or sperm but also begin to liberate larger amounts of the appropriate sex hormone.

In males, the increased amount of male sex hormone stimulates growth of the external genitals and growth of facial hair, and is a factor in the change of voice pitch observed at this time. In girls the increased amount of female sex hormone has far-reaching effects (Greulich *et al*, 9). The so-called secondary sex characters are stimulated by this hormone. The breast development observed in adolescence is a result of mammary growth stimulated by the female sex hormone. Associated with changes in the reproductive organs (44) is the cyclic menstrual bleeding, at first somewhat irregular as to interval (14). As previously noted, a more or less regular menstrual cycle becomes established as maturity is reached.¹³

With the beginning of menstruation in girls, a change occurs in the trend of average growth curves for a number of physiological variables. This has been clearly shown in the California study (40) by using as a reference point the age at which menstruation first appeared, and computing values for physiological measures at six-month intervals in each direction from the menarche. Figure 11 shows the results of this analysis for a total of 52 cases.¹⁴ From this figure it may be seen that the progressive rise in systolic blood pressure ceases near the menarche and thereafter maintains a fairly uniform level. Pulse rate also rises during the premenarcheal years, with a maximum rate during the year prior to the menarche; the maximum rate is followed by a decline.

¹³ In females cyclical fluctuations have also been observed in other physiological functions such as basal metabolism (16), body temperature (53), excretion of water (26), citric acid, and estrogenic (female sex) hormones (11).

¹⁴ The method of analysis is similar to that illustrated in Figure 8 of chapter ii p. 20.

Perhaps the most striking nonsexual physiological change at menarche is the sudden fall in basal metabolism, which commonly follows the beginning of menstruation. At this time there is also a cessation of growth increase in respiratory volume. In general, with the beginning of menstruation in girls we may look for a stabilization of physiological functions and a rapid approach to adult levels.

Although the beginning of menstruation has often been found useful as an index of physiological maturity, as shown in chapter ii (p. 30) it suffers from certain limitations. Chief among these is that it can be applied to only half of the total adolescent population. Hence, other indices of physiological maturity are needed which are appropri-

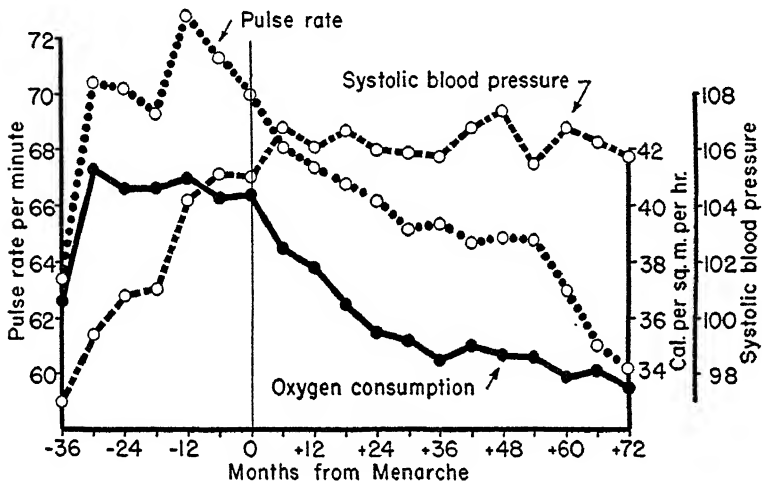


Fig. 11.—Basal functions as related to maturity.

ate for boys as well as girls. One such index, described in the two preceding chapters, is the age at which maximum growth in height takes place (45, 46). Since anthropometric measurements were taken on all subjects in the California study at approximately six-month intervals, plots of growth increments per 0.1 year could be made for each subject. The age of maximum growth increment was taken as the middle of the six-month period in which maximum growth rate was observed. When this criterion of maturity was used, results similar to those shown in Figure 11 were obtained for boys and girls. Figure 12 presents a comparison of results using the two methods of assessing speed of maturing. The first pair of curves (A) shows the average oxygen consumption of eight early- and eight later-maturing girls classified ac-

according to age at menarche. The curves marked *B* provide a similar comparison of two groups of girls (eight each) based on age of maximum growth rate of stem length. The curves marked *C* show the same comparison for two groups of boys (eight each) also selected on the basis of age of maximum growth in stem length. In all three sets of curves it is apparent that early-maturing children are nearer adult levels of basal metabolism, even at the age of 12 years, than are later-maturing children. In curves marked *B* the premenarcheal rise in basal metabolism may be seen in the late-maturing group of girls. Basal metabolism in the early-maturing girls had dropped to adult levels by the age of 15.5 years, while the metabolism of late-maturing girls was still falling at a rapid rate at the age of 17.5 years. Thus, similar results are obtained with two different measures of maturity. In other

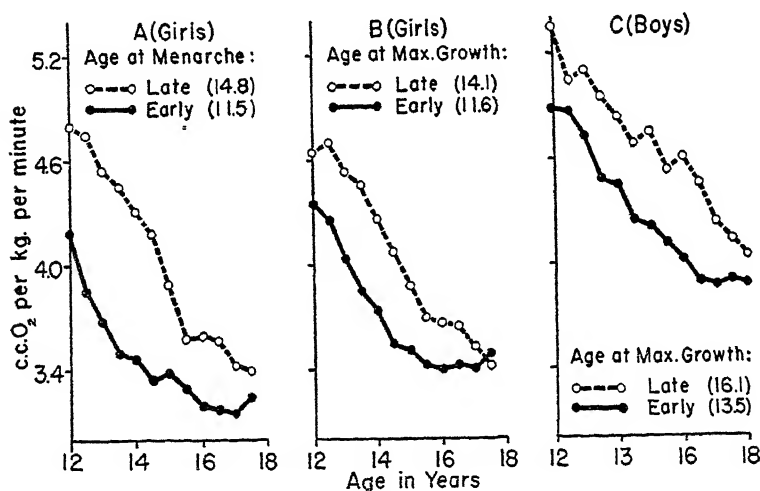


FIG. 12.—Basal oxygen consumption—early- and late-maturing groups.

physiological measures also, such as pulse rate and blood pressure, the early-maturing groups were closer to the adult level at 12 or 13 years than were the later-maturing groups.

In view of the role of endocrine secretions in stimulating sexual development and maturity, information about the amount of such hormones circulating in the blood at any given time is of utmost importance.

At the present time we do not have analytical methods of sufficient specificity and sensitivity to detect the minute amounts of gonadotrophic, estrogenic (female sex), or androgenic (male sex) hormones

present in the blood stream. Hence, attention has been directed to determining the amounts of these substances excreted in the urine, for which much larger samples may be obtained. Even here the methods used depend on the biological response of immature test animals (rats, mice, chicks) to the injection of extracts prepared from urine samples. For such tests the total urine output must be collected for a period of several days in order to yield enough of the hormone to permit an adequate bioassay. Furthermore, the meaning of increased urinary excretion of a hormone is difficult to assess. An increased excretion is usually taken as an indication of greater production of the hormone by the appropriate gland. There is no definite assurance, however, that the increased excretion is not the result of diminished utilization because, after all, the hormone appearing in the urine represents the amount that is wasted or lost to the animal body.

Various studies have reported somewhat divergent values for the excretion of gonadotrophic hormone in children.¹⁵ In perhaps the most adequate research to date, Greulich *et al* (10) analyzed urine specimens for sixty-four boys aged 10 to 17 years. At ages less than 12.5 years all tests were negative as to the presence of gonadotrophic hormones; beyond this age some tests were positive, and beyond about 16 years all tests were positive. As would be expected, the boys were more homogeneous with respect to hormone excretion when classified into maturity groups than when classified on the basis of chronological age.

It may be concluded, from the above and other recent studies, that measurable amounts of gonadotrophic hormone first appear in the urine during adolescence. With advancing age and developmental status there is a general tendency for this hormone to increase in amount from the undetectable levels of early childhood to levels characteristic of the adult. Since castration in prepubertal boys leads to an immediate large output of gonadotrophic hormone (13), it may be assumed that either the immature pituitary gland excretes some gonadotrophic substance which is completely utilized by the immature gonad, or the immature gonad exerts on the pituitary some inhibitory effect which normally diminishes at puberty. Thus, there is no reason to believe that the onset of puberty in boys is characterized by a sudden secretion of the pituitary gland. A probable mechanism for the initiation of puberty is a gradual increase in pituitary secretion coupled with an increasing sensitivity of the gonads to the hormone.

¹⁵ See references 21, 22, 29, 35, 36, 39, 47.

Both boys and girls excrete small amounts of estrogenic hormone.¹⁶ Before the age of 10 the amount excreted is from three to twenty international units per twenty-four hours for both sexes. After age 11 the daily excretion of estrogens increases rapidly in females, reaching values of two hundred to four hundred units per 24 hours (28). (See Figure 13.)

Adult women show a cyclic variation in the excretion of estrogens which follows the menstrual cycle. During the menstrual flow or just prior to its beginning, the excretion of estrogens usually falls to a minimum, while the maximum excretion occurs during the middle of the menstrual cycle (twelve to sixteen days after the beginning of the flow). Marked individual variations in the amount of estrogen excretion have been observed (11).

The assay of male sex hormone is most reliably effected by administering potent extracts of the hormone to day-old chicks and measuring the resulting growth response of the comb. Using this method Greulich *et al.* (10) determined the daily excretion of male sex hormone in eighty-two boys between the ages of about 8 and 17 years. Expressed in terms of the accepted "international units," between the ages of 8 and 14 years the average excretion of male sex hormone per 24 hours was 8.5; this increased to 10.8, 21.5, and 24.8 for 14-, 15-, and 16-year-old boys, respectively. The range, however, was very great: from 1 to 34 I.U. among the younger boys, from 2 to 57 I.U. among the older boys. When grouped according to maturity ratings more uniformity was found. However, even the most mature group still showed a range of 17 to 95 international units excreted per 24 hours.

Because of the difficulties involved in the bioassay method, attempts have been made to utilize chemical tests for the estimation of male sex hormone. Such chemical tests do not yield results which are directly comparable to those obtained with the comb growth (bioassay) method. In addition to the difference in units, the chemical tests are influenced by other substances in the urine which are chemically similar to male sex hormone but which are produced by glands other than the testes (for example, the adrenal cortex). Oesting and Webster (30) used such a chemical method in determinations on urines from forty-three boys ranging in age from 3 to 15 years. No measurable quantity of

¹⁶ The "female sex hormone" produced by the ovary (and placenta) is the chief estrogenic hormone. However, many other substances have been found to have estrogenic activity; that is, when injected into animals from which the ovaries have been removed these substances will produce the characteristics of estrus or heat, as will extracts of the female sex hormone.

androgenic substance was found in urine from boys earlier than 12.5 years; among the older boys wide individual differences occurred. Nathanson *et al* (28) have reported somewhat similar results. Figure 13¹⁷ shows average curves based on their data. Below the age of 12 years the amount of androgens excreted into the urine is only slightly less in girls than in boys. Beyond this age excretion increases more

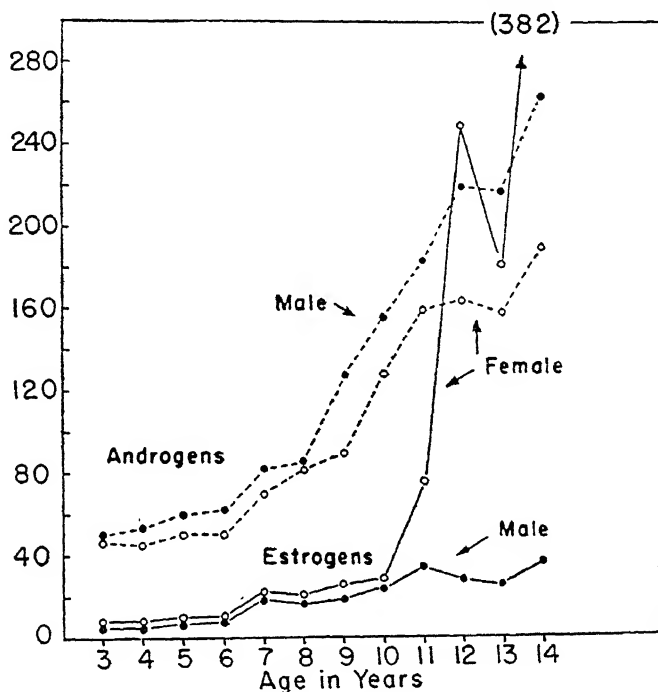


FIG. 13.—Age changes in excretion of sex hormones. (After Nathanson *et. al.*)

rapidly in boys than in girls. Talbot *et al* (47), using a modified chemical method, were unable to find significant sex differences in androgen output even at 16-18 years, but these results do not seem to be typical. We may conclude that before the age of 11 or 12 years both boys and girls excrete measurable amounts of male and female sex hormone. Slightly greater amounts of male hormone are obtained from boys, and slightly greater amounts of female sex hormone from girls, but the differences are not striking. After the age of 11 years, the excretion of female sex hormone markedly increases in girls and the excretion of male hormone increases correspondingly in boys so that a large dif-

¹⁷In this figure androgens (determined as 17-ketosteroids) are expressed in arbitrary color units, estrogens in international units.

ference between the excretory pattern of the two sexes becomes established.

The endocrine changes in adolescence thus seem to be characterized by an increased secretion of the pituitary gland which stimulates the maturation of the sex glands themselves. With maturation of the sex glands increased amounts of male or female sex hormones are liberated into the blood stream, stimulating growth and development of accessory sex organs, and resulting in the appearance of secondary sex characters. While copulatory behavior in animals is influenced and often determined by the level of sex hormones present in the blood, no such clear-cut relationships have been demonstrated in the human. However, studies on humans surgically deprived of their sex glands have indicated that when the operation is performed prior to puberty, interest in individuals of the opposite sex fails to develop. When castration is performed in the adult, normal sex behavior is not always lost, even though procreation does not occur. Young adults with retarded sex development are reported to show increased interest in members of the opposite sex following administration of the appropriate sex hormone. Thus, even though extensive controlled experiments are still lacking, we may safely assume that in humans, the increased amounts of sex hormone in the blood play a part in the arousing of sex behavior. However, the social and cultural environment have built up such a complex system of taboos and restraints to the basic urges of procreation, that the expression of such urges, stimulated by physiological processes, may take a wide variety of forms. While certain aspects of such behavior need not be regarded as providing their own justification, their basic origin should certainly be recognized and understood by adults who must guide and direct the adolescent youth.

REFERENCES

1. BOOTHBY, W. M., and SANDIFORD, I. *Laboratory Manual of the Technique of Basal Metabolic Rate Determinations*. Philadelphia: W. B. Saunders, 1920.
2. ———. "Normal Values of Basal or Standard Metabolism: A Modification of the Du Bois Standards," *American Journal of Physiology*, XC (1921), 290-91.
3. BROUHA, L.; GRAYBIEL, A.; and HEATH, C. W. "The Step Test: A Simple Method of Measuring Physical Fitness for Hard Muscular Work in Adult Man," *Revue Canadienne de Biologie*, II (1943), 86-92.
4. CANNON, W. B. "Organization for Physiological Homeostasis," *Physiological Reviews*, IX (1929), 399.
5. DAWSON, P. M. *The Physiology of Physical Education*, pp. 705-51. Baltimore: Williams & Wilkins, 1935.

6. DU BOIS, D., and DU BOIS, E. F. "A Formula to Estimate the Approximate Surface Area if Height and Weight Be Known," *Archives of Internal Medicine*, XVII (1916), 863.
7. ESPENSCHADE, ANNA. *Motor Performance in Adolescence, Including the Study of Relationships with Measures of Physical Growth and Maturity*. Monographs of the Society for Research in Child Development, Vol. V, No. 1. Washington: National Research Council, 1940. Pp. 126.
8. GALLAGHER, J. R., and BROUHA, L. "Dynamic Physical Fitness in Adolescents," I, II, and III, *Yale Journal of Biology and Medicine*, XV (1943), 659-88.
9. GREULICH, W. W.; DAY, H. G.; LACHMAN, S. E.; WOLFE, J. B.; and SHUTTLEWORTH, F. K. *A Handbook of Methods for the Study of Adolescent Children*. Monographs of the Society for Research in Child Development, Vol. III, No. 2. Washington: National Research Council, 1938. Pp. 406.
10. GREULICH, W. W.; DOBFMAN, R. I.; CATCHPOLE, H. R.; SOLOMON, C. I.; and CULOTTA, C. S. *Somatic and Endocrine Studies of Puberal and Adolescent Boys*. Monographs of the Society for Research in Child Development, Vol. VII, No. 3. Washington: National Research Council, 1942. Pp. 85.
11. GUSTAVSON, R. G.; MASON, L. W.; HAYS, E. E.; WOOD, T. R.; and D'AMOUR, F. E. "The Quantitative Determination of Estrogenic Substances in Normal Female Urine during the Menstrual Cycle," *American Journal of Obstetrics and Gynecology*, XXXV (1938), 115-26.
12. HALL, G. S. *The Psychology of Adolescence*. Vols. I, II. New York: D. Appleton, 1905. Pp. xx + 589; vi + 784.
13. HAMBURGER, C. "Studies on Gonadotrophic Hormone from the Hypothesis and Chorionic Tissue with Special Reference to Their Differences," *Acta pathologica et microbiologica Scandinavica*, Supplement 17, 1933.
14. HARTMAN, C. C. *Time of Ovulation in Women*. Baltimore: Williams & Wilkins Co., 1936. Pp. x + 226.
15. HENRY, F., and FARMER, D. "Functional Tests, II: The Reliability of the Pulse-Ratio Test," *Research Quarterly*, IX (1938), 81-87.
16. HITCHCOCK, F. A. and WARDWELL, F. R. "Cyclic Variations in the Basal Metabolic Rate of Women," *Journal of Nutrition*, II (1929), 203-14.
17. JENSS, R. M., and SHOCK, N. W. "A Mathematical Expression for Oxygen Consumption Following Violent Exertion," *American Journal of Hygiene*, XXIV (1936), 88-93.
18. JOHNSON, R. E.; BROUHA, L.; and DARLING, R. C. "A Test of Physical Fitness for Strenuous Exertion," *Revue Canadienne de Biologie*, I (1942), 491-503.
19. JONES, H. E. "The Adolescent Growth Study. I: Principles and Methods. II. Procedures," *Journal of Consulting Psychology*, VI (1939), 157-59; 177-80.
20. ———. *Development in Adolescence*. New York: D. Appleton-Century Co., Inc., 1943. Pp. xvii + 166.
21. KATZMAN, P. A., and DOISEY, E. A. "The Quantitative Determination of Small Amounts of Gonadotropic Material," *Journal of Biological Chemistry*, CVI (1934), 125-39.

22. ———. "A Note on the Preparation of Gonadotropic Extracts of Urine of Pregnancy by Tungstic Acid Precipitation," *Journal of Biological Chemistry*, CVII (1934), 513-18.
23. LAMB, F. W., and SIMPSON, J. V. A. "Assessment of Schoolboys by Air Force Tests," *Journal of Physiology*, LXV (1928), xiv-xv.
24. LARSON, L. A. "A Study of the Validity of Some Cardio-Vascular Tests," *Journal of Experimental Education*, VII (1939), 214-20.
25. MASTER, A. M., and OPPENHEIMER, E. T. "A Simple Exercise-Tolerance Test for Circulatory Efficiency with Standard Tables for Normal Individuals," *American Journal of Medical Sciences*, CLXXVII (1929), 223-44.
26. McCANCE, R. A.; LUFF, M. C.; and WIDOWSON, E. E. "Physiological and Emotional Periodicity in Women," *Journal of Hygiene*, XXXVII (1937), 571-611.
27. McFARLAND, R. A., and HUDDelson, J. H. "Neurocirculatory Reactions in the Psychoneuroses Studied by the Schneider Method," *American Journal of Psychiatry*, XCIII (1936), 567-99.
28. NATHANSON, IRA T.; TOWNE, LOIS E., and AUB, JOSEPH C. "Normal Excretion of Sex Hormones in Childhood," *Endocrinology*, XXVIII (1941), 851-65.
29. NEUMANN, H. O., and PETER, F. "Die Hormonausscheidungen im Kindesalter," *Zeitschrift für Kinderheilkunde*, LII (1931), 24-30.
30. OESTING, R. B., and WEBSTER, F. "The Sex Hormone Excretion of Children," *Endocrinology*, XXII (1938), 307-14.
31. OGDEN, E., and SHOCK, N. W. "Circulatory Changes During Recovery from Intense Exertion," *Proceedings of the Society for Experimental Biology and Medicine*, XXXIII (1935), 5-8.
32. PETERS, J. P., and VAN SLYKE, D. D. *Quantitative Clinical Chemistry*, Vol. II, *Methods*, pp. 177-216. Baltimore: Williams & Wilkins Co., 1932.
33. RICHEY, HERMAN G. "The Blood Pressure in Boys and Girls before and after Puberty," *American Journal of Diseases of Children*, XLII (1931), 1281-1330.
34. ROBINSON, S. "Experimental Studies of Physical Fitness in Relation to Age," *Arbeitsphysiologie*, X (1938), 251-323.
35. SÆTHRE, H. "Über die Ausscheidung von Prolan im Harn in der Involutionsperiode bzw. im Senium. Untersuchungen an normalen und psychiatrischen Material," *Klinische Wochenschrift*, XII (1933), 1727-29.
36. ———. "Quantitative Bestimmungen der Ausscheidung von Prolan bei geschlechtsreifen und bei greisen Männern." *Klinische Wochenschrift*, XIV (1935), 376-78.
37. SCHNEIDER, E. C. *Physiology of Muscular Activity*. Philadelphia: W. B. Saunders Co., 1933. Pp. 401.
38. SCHNEIDER, E. C., and TRUESDELL, D. "Daily Variations in Cardiovascular Conditions and a Physical-efficiency Rating," *American Journal of Physiology*, LXVII (1923), 193.
39. SCHÖRCHER, F. "Zur Physiologie und Pathologie der Prolanausscheidung im Harn bei Kindern und Jugendlichen," *Klinische Wochenschrift*, X (1931), 2221-22.

40. SHOCK, N. W. "The Effect of Menarche on Basal Physiological Functions in Girls," *American Journal of Physiology*, CXXXIX (1943), 288-91.
41. ———. "Standard Values for Basal Oxygen Consumption in Adolescents," *American Journal of Diseases of Children*, LXIV (1942), 19-32.
42. ———. "Basal Blood Pressure and Pulse Rate in Adolescents." (In press).
43. SHOCK, N. W.; OGDEN, E.; TUTTLE, P. M. "Apparatus for Measuring Oxygen Consumption in Human Subjects at Rest and after Exercise," *Child Development*, XI (1940), 189-201.
44. SHORR, E. "Endocrine Problems in Adolescence," *Journal of Pediatrics*, XIX (1941), 327-46.
45. SHUTTLEWORTH, F. K. *Sexual Maturation and the Skeletal Growth of Girls Age Six to Nineteen*. Monographs of the Society for Research in Child Development, Vol. III, No. 5. Washington: National Research Council, 1938. Pp. 56.
46. ———. *The Physical and Mental Growth of Girls and Boys Age Six to Nineteen in Relation to Age at Maximum Growth*. Monographs of the Society for Research in Child Development, Vol. IV, No. 3. Washington: National Research Council, 1939. Pp. 291.
47. SOEKEN, G. "Zur Physiologie der Pubertät. Die Ausscheidung des Hypophysenvorderlappenhormone-A im Urin," *Zeitschrift für Kinderheilkunde*, LIII (1932), 339-44.
48. TALBOT, N. B.; BUTLER, A. M.; BERMAN, R. A.; RODRIGUEZ, P. M.; and MACLACHLAN, E. A. "Excretion of 17-Ketosteroids by Normal and by Abnormal Children," *American Journal of Diseases of Children*, LXV (1943), 364-75.
49. TRUESDELL, D., and CROXFORD, G. "Periodic Variations in Blood Pressure, Pulse and the Physical Efficiency Test," *American Journal of Physiology*, LXXIX (1926), 112-18.
50. TUTTLE, W. W. "The Use of the Pulse-Ratio Test for Rating Physical Efficiency," *Research Quarterly*, II (1931), 5-17.
51. TUTTLE, W. W., and SKIEN, J. S. "The Efficiency Rating of High-School Boys as Shown by the Pulse-Ratio Test," *Research Quarterly*, I (1930), 19-33.
52. TUTTLE, W. W., and WELLS, G. "The Response of the Normal Heart to Exercise of Graded Intensity," *Arbeitsphysiologie*, IV (1931), 519-26.
53. ZUCK, T. T. "The Relation of Basal Body Temperature to Fertility and Sterility in Women," *American Journal of Obstetrics and Gynecology*, XXXVI (1938), 998-1005.

CHAPTER V

ADOLESCENT PROBLEMS RELATED TO SOMATIC VARIATIONS

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It is usually difficult to separate the threads which are interwoven to form a pattern. In human personality the difficulties become almost insurmountable by the fact that in the process of separation the essential quality of the constituent is changed. Just as a red thread takes on a different hue beside a blue or yellow thread, so being five feet three inches tall may be of no concern to one boy and the center of concern for another. Even for the same individual, freckles may be ignored when eight years old and wept over or sworn at when fifteen.

In this chapter, therefore, we shall attempt to analyze some of the somatic conditions which may be involved in problems which adolescents face. Sometimes these are anatomical and physiological changes peculiar to the second decade of life; sometimes they are bodily conditions which have a changed significance because of the adolescent's development. In following this discussion the reader should remember that just what the meaning of variation in somatic conditions will be to any boy or any girl can only be determined by a study of that individual.

It seems pertinent for the purposes of this discussion to recall the more specific findings regarding the time of onset, duration, and time of close of the adolescent phase of growth, and to review briefly the growth phenomena which in their dynamic interplay are considered characteristic for adolescents. First, let us look at the phenomena which we call physical (11).

I. THE TIMING OF PHYSICAL-GROWTH CHANGES

Usually between the age of eight years and twelve years among girls and between nine years and thirteen years among boys there commences a sequence of changes in velocity of increase in height, body breadth, and body depth, in heart size, lung capacity, muscular strength, and other structures and functions. This particular sequence of changes in the velocity of physical growth is unlike anything which has occurred before and unlike anything which comes afterward. The sequence lasts for from four and one-half to seven and one-half years and is completed somewhere between the ages of fifteen and eighteen years in girls; between seventeen and twenty years in boys.

Without entering into any detailed analysis of the pattern of growth-velocity changes, it may be said that the sequence usually begins with a brief period during which velocity is below the general level for the several preceding years. This is followed by the characteristic puberal cycle of rapid acceleration and rapid deceleration. Then comes the final phase during which velocity is low and slowly decelerating to zero. This is the pattern for body dimensions, organ dimensions, and physical functions which follow the "general" curve of growth according to Scammon's classification (6: 193).

But there are other parts of the body which follow a different growth pattern which Scammon has called the "genital" curve, and for them the changes in velocity during the adolescent period are even more striking. During childhood the velocity of development of the ovaries, uterus, external genitalia, pubic hair, and mammary glands in girls, and of the testes, prostate gland, external genitalia, pubic hair, and facial hair in boys has been much lower than for body parts which follow the general curve. During adolescence they far outstrip these other body parts in velocity of growth, thus emphasizing for all concerned that adolescence is the period when *children* are becoming *men* and *women*.

The physiological phenomena of ovulation in girls and discharge of motile spermatozoa by boys naturally accompany the structural maturation of the appropriate genital organs. They occur during the middle third of the adolescent period at a time when the velocities of growth in skeletal structure, organ structure, and genital structure are close to their puberal peaks. Certainly this aspect of the physiologic maturing of the procreative function is important as a new factor in social relations, but it is only one among many such factors which together spell adolescence.

Thus far in our review of the salient physical-growth features of adolescence we have stressed the general differences of growth-velocity pattern which characterize any adolescent. It remains to point out two other things about physical growth during this period which may be pertinent for the consideration of problems associated with somatic development.

The first is that the degree of *asynchrony* of development as between leg length and stem length, hip width and shoulder width, muscle mass and muscle strength, which is in all probability idiomatic for each individual throughout the whole span of physical growth, becomes more obvious and perhaps in itself somewhat disturbing during the period of marked acceleration and deceleration which we call the puberal cycle. For a period of six months to a year and a half a boy or girl may become noticeably long-legged and short-waisted because of a temporary disproportionate growth of the legs. Similarly, asynchrony of development as between hip width and shoulder width may result in a temporary but noticeable change in body proportions. Again, there is a characteristic lag in increase in muscular strength in relation to increase in muscular mass. Perhaps training as well as developmental rhythm may be causative in this last instance, but the phenomenon still remains as significant and seems to illustrate a systematic asynchrony of development. For boys it may present a real problem of adjustment.

The second feature of adolescent development which has particular bearing upon this discussion is that there is very considerable variation among individuals of the same sex as to the chronological age at which the period of adolescence begins, the rate at which the adolescent-growth sequence proceeds, and the chronological age at which the adolescent period ends (cf. pp. 58ff). The significance of this normal variation among individuals in the timing of adolescent growth has been pointed out by Crampton (3) and others with particular reference to its implications for our methods of classifying pupils for group instruction. The importance of maturational acceleration or retardation, as a factor which may disturb individual adjustment during the second decade of life, seems to deserve greater emphasis than it has received heretofore (8: 89-98).

II. PSYCHOLOGICAL FACTORS RELATED TO THE BODY

During the period when a boy or girl is experiencing these fundamental changes within his body, his behavior is dominated by the same basic drives which have been present since birth. These, in general,

include the drives for sustaining self as a biological unit (eating and elimination, rest and activity, air, warmth, etc.); the drive for relations with other people; the drive for understanding the world and the relation of self to the world and universe. But during adolescence certain of these drives take on a new quality and emerge in greater strength than ever before. Experience has shown that during adolescence the individual becomes increasingly aware of "self" and strives not only for the development of self ideals but for the acceptance of himself in harmony with those ideals. He is concerned with himself in the world of his peers; to be accepted by them, to feel he has a place among them, to build a few close friendships. As he develops he becomes increasingly aware of the opposite sex and his desires reach toward establishing satisfying heterosexual relations and toward the assurance of his own sex appropriateness.

Toward later years of adolescence his drives for self-assurance and acceptance extend into the adult world and to his own future place among his peers in that world. These self-social drives are as characteristic of adolescence as is accelerated somatic development, and the two are inextricably intermeshed in the feelings and attitudes of the individual (1: part iii; 9; 15).

III. THE BODY AS THE SYMBOL OF THE SELF

In a development of self-goals and self-acceptance which gains momentum with the onset of adolescence, the body has a special significance. Changes in body contours, new sensory experiences from developing sex organs, the upsurge of energy, new as well as heightened emotional responses—all tend to focus the attention of a boy or girl on his body. These bodily experiences are the not-to-be-ignored signs of growing up, and become in a certain sense the symbol of emerging manhood or womanhood. The changing body becomes a symbol, not only of being different from last month or last year, but of a new attitude toward self, toward others, toward life.

This focusing of attention on the body is probably a concomitant of those periods in human life when the velocity of physical change is rapid, as in infancy and adolescence. The concept of self in the infant is partly built up through sensory experiences from the skin, partly through internal sensations, and partly through exploration of the body. As changes in growth bring changes in sensations or appearance, interest in the body is renewed and concepts of self undergo revisions (15: chap. ii).

Culture also plays its part in emphasizing the importance of the body and attitudes toward the body. Here the family has a primary role. The bodily functions of eating and elimination, activity and rest consume a large portion of a child's life and are the primary concern of adults who care for him. Adults directly and indirectly inculcate the value of cleanliness, of neatness in appearance, of appropriate hair dress, of becoming clothes. Equally impressed are certain restrictions concerning the body: specific parts which must not be manipulated or exposed, functions which are "not nice," and must be associated with privacy (4).

As a child grows older he becomes increasingly aware of the attitude of others outside of his home toward questions related to his body, attitudes which may support his early experiences in family life, which may raise conflicts or doubts within him or which may give him release for thwarted impulses and desires. Some of these new influences come to him from his playmates, some from his enlarging contact with the world of adults through cinema, radio, printed material, as well as through direct observations.

Through his association with other children, a child gradually becomes conscious of likeness and difference in appearance and performance. With the developing desire for identification with and acceptance by his peers, it becomes important to him to be like his playmates. One of the greatest obstacles to social acceptance is being different. A child in elementary school may easily become the butt for teasing or group ostracism because he speaks with a peculiar accent, has cross-eyes, red hair, or wears clothes different from his classmates. With the accentuation which adolescence brings to the need for social acceptance by peers, the wanting to be like and not wanting to be different tends to modify persistently both outward behavior and attitudes toward self.

Thus each boy and girl in our culture gradually cumulates into "self" attitudes toward his body, a mixture of identification and rejection, of pride and embarrassment, of concern and ignoring. The pattern which these attitudes will take in the matrix of his personality can be determined only by careful study of his individual development.

IV. PROBLEMS OF ADJUSTMENT

Before discussing the problems of adolescents which are related to specific somatic conditions, it is well to remember that the extent to which any bodily condition will affect the equilibrium of a person and

cause him to have problems of adjustment will depend on several factors. All human beings are most vulnerable in those areas where lie their strongest drives. It can be assumed that any condition which cuts across vital urges or endangers their fulfillment becomes a hazard for an individual and a potential source of basic frustration. For a girl in adolescence, any somatic condition which interferes with her acceptance by girls, or prevents her from looking and acting in keeping with her ideals of being attractive, or which makes the boys avoid her will certainly be a potential hazard. For a boy, one finds concern to be clustered around somatic conditions which keep him from looking masculine, from doing the things which win him prestige among other boys, from being popular with girls, and, toward later adolescence, from achieving success in preparation for his chosen vocational pursuit.

How serious such problems may become for any boy or girl will depend upon how strong the drive is and how drastically the condition interferes with the satisfactions of his urges. How each person "takes" these frustrations will be determined by previous life experiences and will be modified by the extent to which he is finding genuine satisfactions in other basic areas of life which may lessen the strains in the frustrated areas.

The systematic appraisal of physical status and development of the same adolescents every six months by the same physician, which was one of the procedures used by the Institute of Child Welfare at the University of California over a period of eight years (7), presents an unusually favorable opportunity for discovering boys or girls who are disturbed concerning their physical characteristics.¹ Naturally it is sometimes difficult to draw the line between "interest" and "disturbance," and even more difficult to support such a distinction with objective evidence.

A careful review of the records by the physician who knew and examined ninety-three boys in the California study leads him to the conclusion that at least twenty-nine of them, at one time or another during the eight-year period, were definitely disturbed concerning their physical characteristics. Of these twenty-nine, there were five for whom the acceptance of their individual physical differences manifestly constituted a major problem of adjustment.

The physical manifestations over which these adolescent boys appeared to be disturbed may be listed as follows:

¹ In the remainder of this chapter, this study will be referred to as the California study.

<i>Physical Manifestations Which Disturbed Boys</i>	<i>Number of Boys</i>
Lack of size—particularly height.....	7
Fatness	7
Poor physique	4
Lack of muscular strength.....	4
Unusual facial features	4
Unusual development in the nipple area.....	4
Acne	3
Skin blemishes, scars	2
Bowed legs	2
Obvious scoliosis	2
Lack of shoulder breadth.....	1
Unusually small genitalia	1
Unusually large genitalia	1

The data from the girls have not been analyzed as carefully in this respect, but preliminary inspection indicates that among the eighty-three girls there were thirty-eight who gave evidence of being disturbed by their physical characteristics. The primary causes of disturbance were as follows:²

<i>Physical Manifestations Which Disturbed Girls</i>	<i>Number of Girls</i>
Tallness	7
Fatness	7
Facial features	5
General physical appearance	5
Tallness and heaviness	3
Smallness and heaviness	3
Eye glasses and strabismus.....	2
Thinness and small breasts.....	2
Late development	2
Acne	1
Hair	1
Tallness and thinness	1
Big legs	1
One short arm	1
Scar on face	1
Brace on back	1

The foregoing 31 per cent of boys and 41 per cent of girls who suffered known anxieties concerning physical factors represent a minimum accounting, since others undoubtedly had, at one time or another, some degree of disturbance in this area which did not come to the physician's attention.

² Analysis made with co-operation of Judith Chaffey, Consultant in Individual Guidance, Public Schools, Oakland, California.

V. ADJUSTMENTS TO DIFFERENCES IN BODY SIZE AND PROPORTIONS

In describing any human being, we are apt to commence with an adjective which classifies him or her as to body size. This is true in police descriptions of wanted criminals as well as in living room conversations about celebrities. We not only classify our fellows as short or tall, heavy or slight, big or small, but we also tend to evaluate them favorably or unfavorably on the basis of cultural standards regarding appropriate sizes for men and women. It is not surprising, therefore, that most adolescents are distinctly aware of their size and that there are some who are sensitive about their variation from the cultural norm.

Differences in body size and proportions are not a special characteristic of adolescence, for they exist among human beings from birth to death. But these differences are much more frequently disturbing to adolescents (beginning with the cycle of puberty) than they are to younger children. One obvious reason for this is the enhanced awareness of their bodies which adolescents acquire partly from the consciousness of their own physical development and partly from their increasing identification with culturally determined ideals concerning appropriate physical characteristics for men and for women. Another probable reason is related to the time dimension of life. In childhood, years of growth stretch indefinitely ahead and growing-up, adequate in every respect, is taken for granted. But during puberty, boys and girls begin to realize that the years of growth are numbered and they are faced with the reality of permanent differences of size in relation to other people. Perhaps a third reason why differences in height become more significant to individuals as they approach their mature stature is because these differences as measured in feet and inches are actually greater even though relative heights may remain the same.

a. Lack of Size—Particularly Height. The seven boys who were concerned because they were small illustrate how a boy's reaction depends not only upon his actual deviation from the average but also upon his aspiration. Four of them were actually among the shortest 15 per cent of the ninety-two boys all through the adolescent period. But there were five other boys in the same short group who gave no evidence of being disturbed about it. Two of the seven were as tall as 20 per cent of the total group, and there were fifteen boys shorter than they were who didn't seem to care. The last of the seven was about average in height when he completed adolescence, but he was a boy who developed late and so during his junior high school years was quite short as compared to his chronological-age peers.

Only a short man who has been self-conscious about it for many years can paint the picture of the torments he suffered during adolescence (10). However, even an observer can discern some of the disadvantages of shortness for men in our culture. A short boy or man seems to have greater difficulty in commanding the attention of strangers or casual acquaintances; at the level of superficial social reactions we are apt to associate size with masculine dignity. When we look for leaders among a group of boys whom we do not know very well, we tend to try the larger boys; and of course adolescents are aware of this tendency. More specifically, shortness is a real handicap to a junior or senior high school boy who seeks prestige through athletic prowess in the popular team games. Basketball has become pre-eminently a tall boy's game; high-school football players are usually the tall, heavy boys. In none of the sports most popular among adolescent boys do short boys succeed in achieving representation proportionate to their incidence.

In following the appropriate adolescent urge to establish satisfying social relations with girls, the short boy often finds his lack of size a handicap. This handicap arises partly from the culturally developed preference of girls for men who are "tall and handsome," and partly as the result of the special precocity of girls in relation to boys at this particular stage in their development. At a time when girls tend to seek the companionship of boys older than themselves they are most apt to snub the advances of contemporary boy friends who still both look and act like small boys. In social dancing, both girls and boys much prefer a partnership in which the boy is at least as tall as the girl.

During their adolescence girls seldom complain of being too small, but the *very short* girl, even though she may be well-proportioned, is apt to be sufficiently sensitive over her shortness to do what she can by high heels and upstanding coiffure to make herself look taller. When shortness is combined with heaviness and the girl looks "squatty" she is apt to be disturbed. This was true of three girls in the California study.

b. *Tallness*. Boys in general want to be tall, and tallness does not become a problem for them unless the individual varies widely from his group. Boys of six feet three inches and over, especially if they are extremely thin, may be disturbed by this. Sometimes, boys who are early developers and who "shoot up" conspicuously beyond their classmates will be embarrassed and evade situations where they may attract attention.

For girls, however, being tall may be a genuine emotional hazard. Including the three categories in which this characteristic is noted as a cause of emotional disturbance, eleven girls in the California study were concerned about their tallness—only two less than were worried about fatness or heaviness. One girl was particularly sensitive about her height because several short boys liked her. Another girl was extremely shy and anything which made her conspicuous bothered her. Among the three girls who complained about being large and heavy there was one who actually was neither very tall nor very fat. She *was* unpopular, but according to the other boys and girls this was because she “smelled” and was “sloppy.” In one case, the girl’s height was a decided handicap in her relations with other children. She made an effort to compensate through identification with adults and by gaining intellectual satisfactions. Another of these tall girls was decidedly good looking but did not mature emotionally until very late, and so received no attention from boys.

c. Fatness. Data accumulated during recent years indicate that for nearly all girls and for many boys significant changes in the thickness of the subcutaneous fat layer occur during the adolescent period. In the California study seriatim measurements, made with the calipers designed by Franzen and his co-workers (5), show that in girls this quite unmistakable increase usually occurred after menarche, and that there was usually a subsequent decrease during the last third of the adolescent period. Within this fairly constant pattern many girls showed marked fluctuations in subcutaneous fat measurements at successive examinations.

In 75 per cent of the boys the thickness of the subcutaneous fat layer remained about the same throughout the seven-year period but 25 per cent displayed a definite increase during the early part of the puberal cycle. This increase varied from an amount which merely gave the appearance of slight plumpness to an amount which made fatness the outstanding characteristic. In some cases the thickness of the fat layer decreased again after six months or a year, while in others it decreased slowly over a period of six years or more. In each of the twenty-two cases found there was a definite decrease from the maximum early in the puberal stage to the amount present at the end of adolescence.

Of the twenty-two boys who showed the fat increase phenomenon, only seven gave definite indications to the examiner that they were disturbed over their fatness. Of these seven, all but one had a marked increase early in the puberal cycle; that one showed only a moderate

increase, but he was a slow developer and his fat period commenced just before he passed from junior high school to senior high school at a time when none of his peers were growing fatter. Moreover, his disturbance was induced, in part at least, by the reaction of his parents. There seems to be evidence that in some cases the disturbing factor was the *distribution* of the increased subcutaneous fat, rather than simply the amount of the increase. This will be discussed later in connection with other sexually inappropriate characteristics.

Among the girls, we have seen that at least thirteen were definitely disturbed by their fatness. Most of these were not popular with boys though they may have had some friends among the girls. Two of them were unclean, unkempt, and had strong body-odors. Excessive fat is both cumbersome and unsightly at any age. It interferes with the graceful and effective performance of any locomotor activity (except perhaps swimming) and is, therefore, particularly unwelcome to the adolescent boy who seeks social recognition through athletic achievement. In early adolescence this is to some extent true for girls also, but their disturbance over being fat is more closely connected with the fear of being unattractive in terms of our current cultural ideals. To some teen-age girls in our culture, even a slight plumpness of figure is so disturbing that in attempting to avoid it they may cut their food intake below the minimum necessary for healthy growth. On the other hand, comments and humorous allusions to "getting fat" are so frequent in casual conversation, especially among women, that too much significance must not be attributed to verbal protestations about the matter. Avowed disturbance over slight deviations from the fashionable dress-model figure may serve as convenient conversational camouflage to cover other more important dissatisfactions with the self.³

In any case, the nicknames and thoughtless derogatory comments which, before the adolescent period, may cause the fat boy or girl only rather vague discomfort or no discomfort at all, take on a new penetrative quality for the physically self-conscious and socially sensitive juvenile in the less friendly atmosphere of the junior high school.⁴

VI. ADJUSTMENTS TO SEXUALLY INAPPROPRIATE PHYSIQUE

The fact that during the adolescent period the desire *to grow* is changed gradually but definitely to a desire *to grow sex appropriately*

³ See case of Betty, in Blos (1).

⁴ See "Case Study of Ben," by Lois Meek Stolz (12).

seems to justify special consideration for certain variations in developmental pattern over which some of these boys and girls show disturbance. It is, of course, immediately apparent that in dealing with the concept of sexually inappropriate physique we must include not only characteristics which differentiate males from females biologically, but also those quantitative differences in structure and function which our particular culture emphasizes as distinguishing the ideal feminine from the ideal masculine. Thus, for example, we shall have to consider again tallness or shortness, fatness or leanness, but, in this connection, as they contribute to a more complex pattern of maleness or femaleness.

Turning first to our adolescent boys, we find that of the ninety-two in the California study, twenty-one expressed dissatisfaction with the size or proportions, or alignment, or fatness, or muscular development of their bodies; eight were concerned over facial features or blemishes; one was embarrassed by the scaly quality of his skin; four were sensitive over inappropriate development about the nipple area; and two expressed concern over the size of their genital organs. In examining the serial photographs and measurements of these twenty-nine disturbed lads, one is struck by the fact that it is often the *pattern* of development that seems at fault rather than any single feature or trait. One boy seems to be unnecessarily worried because his shoulders are not broader, but it turns out that really he is disappointed in his whole pattern of physique. He would like to be (1) taller, (2) more broad shouldered, (3) bigger chested, (4) more heavily muscled; and it seems permissible to conclude that his problem of adjustment lies in the discrepancy between his inherited physique and the culturally suggested pattern of manhood which he has accepted.

Perhaps the syndrome of sex-inappropriate physical traits which is most apt to disturb the adolescent boy is the one in which a considerable increase of fat around the hips is combined with small external genitalia, scanty pubic hair, narrow shoulders, and an unusual development of subcutaneous tissue about the nipples. In such a case the feeling of sex-inappropriateness arises not merely from a lack of what is considered acceptable male development, but also from the superficial similarity of the whole pattern to that popularly associated with female development. Since an adolescent boy's concept of being a "regular fellow" is appreciably influenced by the appearance of his peers, and since the syndrome just described is especially apt to occur as a passing phase of maturation for boys who develop slowly and atypically during the early part of the adolescent period, the problem

of adjustment may vary in seriousness from a temporary, vague dissatisfaction to a deep and perhaps lasting insecurity.

The phrase "sex-inappropriate physique" seems useful with reference to boys, but it does not seem to fit girls quite so well. Perhaps "sex-inappropriate face and figure" would be better. But at any rate there is plenty of evidence that during the adolescent period girls, also, are sometimes concerned because their body size and configuration do not correspond closely enough to their ideals for themselves. They show discontent with their pattern of growth toward womanhood. Some of the commonly occurring physical traits which in our culture may combine to give adolescent girls a feeling of sex-inappropriateness are: unusual tallness, squattiness, large hands, large feet, clumsy ankles, undeveloped breasts, very large breasts, pigmented facial hair, extreme thinness, moderate or extreme fatness, heaviness of lower jaw, hairiness of arms and legs, general massiveness of body build.

With girls the sex-appropriate pattern is clearly differentiated from the healthy pattern or the functionally effective pattern. Indeed, many adolescent girls make it quite clear that they wish to appear exotic rather than healthy, that they consider too much muscular strength unbecoming (13), that they would rather see poorly than wear glasses.

Whether girls are more disturbed than boys over the frustration of their sex-linked ideals is, of course, hard to say, but it is certain that they are far more apt to do something to relieve their frustration than boys are. In the improvement of face or figure, they are willing to spend time, forego pleasure, withstand the demands of hunger, endure pain and discomfort. It seems reasonable to conclude, therefore, that even temporary deviations from sex appropriate development are likely to produce definite problems of adjustment for adolescent girls.

VII. PROBLEMS RELATED TO FACIAL APPEARANCE

The face of a person is the primary means of social communication. The language of smiles, laughter, tears, frowns, and fears, as well as the language of words is expressed here. Eyes, mouth, and facial muscles combine in an infinite variety of patterns to tell the story of individual personality. In our culture, the face has a special significance because it is the part of the body which can be exposed without censorship, and therefore becomes traditionally the mark of recognition of a person. The family album as well as posters advertising "Reward for information leading to arrest" testify to this.

Since our culture permits a large amount of artificial modification of the face to meet individual tastes and ideals, we are apt to focus our

attention and hopes in that direction. While it is true that we actually can do some things with hair and skin, modern advertising, wise to human longings, encourages us to believe there are practically no limits to the possibilities in this direction. The desire to improve one's face is not confined to either sex, though present styles give females more opportunity for experimentation.

As with other physical characteristics, boys and girls become increasingly aware of individual facial appearance during the cycle of puberty. Again, we must differentiate between *interest in* and *concern over*. Certainly all girls are interested in their hair during adolescence. It becomes one of the important aspects of growing up, of looking like a young woman instead of a little girl, of gaining independence from maternal domination, of gaining individual distinction. A casual perusal of the photographs of the girls in the California study reveals a series of startling changes in hair dress. At ten years of age the girl almost invariably has a simple hair dress of the type selected by mothers as appropriate for little girls; by sixteen her hair is dressed in a style similar to her peers, but distinctly individual. During the early years of the puberal cycle many girls show a change in hair dress in each photograph taken at six-month intervals. This is a normal, to-be-expected interest of adolescent girls. But there was one girl in the group who was not only interested but deeply disturbed about her hair. She was among the girls who developed late, but whereas some of the girls compensated for this by sophisticated hair dress, at fourteen and a half years she continued to wear a little girl's bob. She hated her hair, said it was "a mess" and she "couldn't do anything with it." Probably she centered on her hair her dissatisfactions with her self and found there the cause of her unpopularity with her peers.

How much an adolescent will be concerned over his own differences in facial characteristics will again be the result of the interrelation of many factors. Features which have always been present may be noticed seemingly for the first time. This was true of Betty in Peter Blos' study, who says about a mole on her face, "When I came into about the seventh grade I didn't think about it, and then I became very, very conscious of it. . . . I never looked at myself before" (1, p. 234).

Dorothy, in the California study, had a scar on her face due to an early burn. She had been conscious of this before the onset of puberty because her mother had focussed attention to it. During adolescence this scar became Dorothy's greatest concern. She was unpopular, probably because she was fat and quite below the average of the group in intelligence. But, to Dorothy, the scar on her face disturbed her

most and seemed to her to be the cause of her lack of success in social relations.

On the other hand, features which have always been present may become accentuated by growth changes in adolescence, and, with increased sensitivity of the individual, become cause for concern. Tom's face was asymmetrical when he first came for physical examinations at ten years of age, as can be seen in the *seriatim* photographs. But this lack of symmetry became more noticeable with the spurt of puberal growth, and then he began to inquire in guarded terms whether anything could be done about it.

Sometimes we find that a boy or girl will center his anxieties on some defect of his face, even though the roots of his difficulties lie in more basic emotional privations. This was perhaps the case in Betty's attitude toward the mole on her face, mentioned previously. It was also evident in a girl in the California group who was worried about her face, but more deeply disturbed about the fact that she was Jewish and that she was good at boys' skills but not at the feminine arts attractive to boys.

Individual boys during adolescence have been found to be concerned about characteristics which seem to jeopardize their being considered masculine, such as wearing eye-glasses, a *retroussé* nose, dimples, receding chin, a small rosebud mouth, lack of beard. They may also be concerned about any feature which is noticeably different: a large nose, a too-prominent lower jaw, irregularities in front teeth, or prominent bands on teeth, large protruding ears, cow-licks, or early baldness, asymmetry of features, or heavy, mature beard. Acne is probably the greatest hazard in complexion for boys; and this is significant when we remember that acne is favored by chemical imbalance and the condition of the sebaceous glands during puberal development and that 70 per cent of boys show some acne during that period. They may also be unduly concerned about other blemishes, such as freckles, moles, birthmarks, oily skin, large pores, or scars.

Among girls, interest in facial appearance may become a genuine concern if a girl feels she is not feminine-looking—if she has a heavy jaw, or hair on the face. But probably more girls are concerned over any characteristic which they think at the time keeps them from being glamorous, such as eye-glasses, bands on teeth, large nose or mouth, or receding chin. Even more than boys, they may become emotionally disturbed by acne, moles, birthmarks, scars, oily skin, large pores, or even freckles.

Joyce had a slight strabismus and wore glasses while she was in

junior high school. She thought she was ugly and this feeling became part of a general insecurity. However, she was one of the most popular girls with boys, perhaps partially because she went out of her way to make herself look pretty and to be attractive to boys.⁵

But it must be remembered that for every example we may give of a girl disturbed because she had to wear glasses or a boy disturbed by his large, prominent nose, the reader can probably match a case with similar characteristics who gave no evidence of any disturbance. Of four girls in the California study who wore glasses, three were concerned about their appearance, while one showed no evidence of disturbance, nor did the fact seem in any way to interfere with her satisfactory social relations. Of all the items mentioned, acne seems to be the only one which almost universally causes emotional difficulties for an adolescent boy or girl, and it will certainly be disturbing if it continues over any considerable period of time.

It is quite often true that an individual who indicates concern over facial characteristics has several things to contend with. For example, Tom who was definitely worried about the asymmetry of his face, also had acne, a noticeably square-shaped jaw, and, because his family was very poor, dressed shabbily and could not participate in the good times his peers enjoyed. Neva, who, of all the girls in the group, probably had the least attractive face—and knew it—was also tall and thin with no redeeming physical characteristic. The girls liked her because of her nice disposition, but the boys left her completely alone all during junior and senior high school.

VIII. PROBLEMS RELATED TO BODY ODORS AND CLEANLINESS

How a person "smells" because of either body odor or lack of it, either scrupulous scrubbing or disdain of it, either perfumed lotions or rejection of them seems particularly important to adolescent boys and girls. Just why this is so we don't quite know; several factors are probably involved in subtle interplay.

Certainly, advertisements during the past twenty years have waged an unrelenting campaign to make us unpleasantly aware of all natural body odors and pleasantly sensitive to the perfume of soaps, lotions, colognes, bath salts, creams, powders, dentrifices, hair tonics, and the like. Commercial advertisements have put "B.O." and "halitosis" into the vocabulary of the nation. The use of Hollywood's glamour girls or New York's wealthy debutantes as sponsors for these advertisements has built a strong connection in each of us between glamour and arti-

⁵ From case record on file, Institute of Child Welfare, University of California.

ficial perfuming. Somewhat less convincing are the association of Hollywood's heroes and noted athletes with sweet-smelling hair tonics and perspiration deodorants.

With the changing attitudes which an adolescent has toward "self," these commercial appeals take on a very personal meaning and increase the already growing sensitivity to his own body odors and to the odors of other boys and girls. Pleasantness of body odor takes on particular significance because of the intimacy or possible intimacy in relations with the other sex. Oddly enough, in the biological history of human beings, natural odors of the body are supposed to have had a special sex attraction. But modern civilization, following the lead of our Puritan ancestors, tended to stigmatize body odors as disgusting and to regard as pleasing only a lack of odor or that of clean soap. American culture, however, has moved again in the direction of the attractiveness of odors to the opposite sex, but today it is the artificial odor of perfume rather than the natural odors of a functioning body.

Whether there is a general acceleration in intensity or a change in quality of all body odors paralleling the rapid development in adolescence, we do not know. Biologically we would expect this in those odors directly connected with sex functioning. This is true regarding the flow at menstruation time, and in some cases for other body odors, especially perspiration during the menstrual period. The heightened activity of boys in strenuous athletics increases perspiration and makes bathing more necessary to prevent "B.O.," smelly feet, and the like.

Among the most derogatory of adolescent slang expressions are, "It stinks," "Stinko," "It smells," and "Smelly,"—usually coupled with the dramatization of holding the nose with the fingers. These are, in a way, symbolic of the social stigma that accrues with certain personal odors. Girls cannot bear a boy whose feet smell, they don't want to dance with a boy whose perspiration has a heavy odor. Boys shy off from girls with strong "B.O." or loud perfume. Bad breath can be a stigma for either boy or girl, and we doubt if even the perfumed lipstick can help the girl whose teeth or intestines need attention. Adolescents are also sensitive about strong food odors that remain on the breath: fish, onions, garlic. Thus they consume large quantities of mouth wash and breath tablets, as well as relying on the inevitable chewing gum.

Closely related to body odors is general cleanliness. During adolescence, boys and girls become increasingly conscious of being clean (14). The smelly little boys of the sixth grade, who hate soap and water, gradually grow into the young men who keep the rest of the

family from using the bathroom. The boy who remains unkempt and dirty after his peers have left that behind may be accepted in male company but, in mixed company, will be ignored by boys and girls alike. In adolescence, a girl who is not clean will be unpopular with girls as well as with boys. Cleanliness refers not only to the body generally, but to finger nails and toe nails (in the swimming pool!), to neck, and ears, and nostrils, and hair. Cassidy states that "the fear of not being able to bathe sufficiently to prevent detection of the unpleasant odor" is one of the reasons why the menstrual period is "fraught with negative feelings" for many girls (2: 29).

Problems of adolescents in this area, then, can be divided into three groups: those that have to do with the adolescent's adjustment to his own new body odors; those which he may face in an effort to lessen his body odors so as to be more acceptable to others; and those adjustments he must make to the odors of other boys and girls.

Sometimes the problem is of a different kind. A girl may be unpopular partly because she has unpleasant body odors and she may not be conscious of the cause. These are affairs which are so personal that it is oftentimes difficult for even a best friend to discuss them with the offending person. It is a delicate matter which needs careful handling, but certainly must be faced by counselor or advisor.

IX. DEFORMITY AND OTHER PERMANENT HANDICAPS

There is no need to stress the difficulties which crippled children, blind children, deaf children, deformed children, children with impaired hearts, and all others with unalterable physical handicaps have in adjusting to life. These are not peculiar to adolescents. It may be pointed out, however, that the full realization of the meaning of such individual differences in terms of social opportunities, vocational choices, and intimate heterosexual comradeship comes to the sufferers during the adolescent period, and often this realization provokes antagonism or despair which is very difficult to assuage and which carries over into adult life.

X. HELPING ADOLESCENTS IN THEIR ADJUSTMENT TO SOMATIC VARIATIONS

For the practical purposes of individual guidance, problems of adjustment exist only when an individual says that he is disturbed or acts as though he were disturbed. In either case it remains for the guide to judge the causative significance of actual or imagined somatic variations. In this discussion we have attempted to point out some

of the somatic variations which seem to have special significance to boys and some which seem to trouble girls during the period of adolescence. We have tried to interpret the feelings of young people about their bodies and their physical development, recognizing that such generalizations are useful only as they stimulate others who are trying to guide young people.

In appraising the importance which an adolescent may attribute to any particular somatic variation which he or she exhibits, we have found it useful to give consideration to the following:

- a) The actual degree of the variation in terms of what is common among peers of the same sex
- b) The degree of variation from the ideal which the adolescent is striving to approach
- c) The obviousness of the variation to associates
- d) The probable duration of the variation
- e) The relation of the variation to other physical variations which the individual exhibits
- f) The relation of the somatic variation to problems of adjustment which arise primarily from other nonsomatic conditions

When one has appraised the nature and importance of the relation between the adolescent's problem of adjustment and the physical factors involved, one is better prepared to choose appropriate treatment. In one case this may consist of persuading the disturbed adolescent that he is exaggerating the differences which are really unimportant. Another adolescent may need assurance that the differences are but a passing phase of normal development. Sometimes a boy or girl can be helped by learning techniques of dress or grooming which render an undesirable physical variation less obvious. Sometimes they need help in developing compensatory assets which will gain for them social acceptance in spite of their physical peculiarities. With sympathetic guidance which leads to the establishment of social acceptance and self acceptance based upon usefulness and friendliness, the adjustment problems of adolescents with even the most distressing physical handicaps may be resolved.

REFERENCES

1. BLOS, P. *The Adolescent Personality*. New York: D. Appleton-Century Co., Inc., 1941. Pp. xiii + 517.
2. CASSIDY, ROSALIND. *New Directions in Physical Education for the Adolescent Girl*. New York: Barnes & Noble, 1938. Pp. xvi + 231.
3. CRAMPTON, C. WARD. "Physiological Age—a Fundamental Principle, *American Physical Education Review*, March, 1908.

4. FRANK, L. K. "The Fundamental Needs of the Child," *Mental Hygiene*, XXII (1938), 353-79.
5. FRANZEN, R. *Physical Measures of Growth and Nutrition*. New York: Child Health Association, 1929. Pp. xii + 138.
6. HARRIS, J. A.; JACKSON, C. M.; PATERSON, D. G.; SCAMMON, R. E. "*The Measurement of Man*." Minneapolis: University of Minnesota Press, 1930. Pp. 215.
7. JONES, H. E. "The Adolescent Growth Study," *Journal of Consulting Psychology*, III (1939), 157-59, 177-80.
8. MEEK, L. H., and OTHERS. "Personal-social Development of Boys and Girls." New York: Progressive Education Association, 1940. Pp. 243.
9. STOLZ, H. R.; JONES, M. C.; and CHAFFEY, J. "The Junior High School Age." *University High School Journal* (Oakland, California), XV (1937), 63-72.
10. STOLZ, H. R. "Shorty Comes to Terms with Himself," *Progressive Education*, XVII (1940), 405-11.
11. STOLZ, H. R. "Some Physical Aspects of Development During the Cycle of Puberty." Atlas and syllabus, on file, Division of Child Development, University of Chicago, and Institute of Child Welfare, University of California.
12. STOLZ, LOIS MEEK. "Case Study of Ben." On file, Division of Child Development, University of Chicago, and Institute of Child Welfare, University of California.
13. STONE, C. P., and BARKER, R. G. "Aspects of Personality and Intelligence in Postmenarcheal and Premenarcheal Girls of the Same Chronological Ages," *Journal of Comparative Psychology*, XXIII (1937), 439-45.
14. TRYON, CAROLINE M. *Evaluations of Adolescent Personality by Adolescents*. Monographs Society for Research in Child Development, Vol. IV, No. 4. Washington: National Research Council, 1939. Pp. 83.
15. ZACHRY, C. B., and LIGHTLY, M. *Emotion and Conduct in Adolescence*. New York: D. Appleton-Century, 1940. Pp. xv + 563.

SECTION II
PHYSICAL, MOTOR, AND MENTAL ABILITIES

CHAPTER VI
THE DEVELOPMENT OF PHYSICAL ABILITIES

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The term "physical abilities" is commonly used to designate achievement levels in various more or less specific aspects of gross motor performance. The more specific aspects may be examined through measurements of the speed of bodily movement, the strength of muscle groups, or the co-ordinative skill displayed in, for example, catching or throwing a ball. Grading upward (in complexity) are measurements of the broader combinations of performance involved in athletic games or sports. For most purposes we find it convenient to distinguish the *gross* motor performances, such as large muscle activities of the athletic or heavy laboring type, from the *fine* motor performances. The former emphasize extensive overt movements of the body as a whole, while the fine motor activities usually involve smaller movements of the hands or feet and emphasize speed or precision. Although there is a gradation between the two types of activity, the distinction is a useful one partly because the gross motor functions are at least moderately intercorrelated and hence may be used to predict the acquisition of new large muscle co-ordinations, while the finer motor reactions are so much more specialized that within a normal range the tests of performance are rarely useful as aptitude measures.¹

The motor development of adolescents presents problems of considerable intrinsic interest to instructors in physical education and to

¹Chapter vii, to follow, will discuss the development of fine motor and mechanical abilities, and the conceptual basis for definitions of skill, aptitude, ability and capacity.

students of motor functions; the wider significance of these problems is also apparent when we consider that physical abilities are by no means isolated aspects of growth in the life of the individual school child. Particularly among adolescent boys, the ability to take part in playground games and to play a normally lively role in various physical activities is more often than not an important factor in the development of successful social relationships.² The general characteristics of growth in this area, and the consequences of retarded or otherwise inappropriate growth, should be well understood by teachers and others who work with adolescents.

I. MANUAL STRENGTH

Strength of grip is the simplest variable included in studies of physical abilities, and the easiest to record. The student of psychological aspects of child development, concerned for the most part with functions less readily observed, may well envy the speed and facility with which a reliable strength record can be made.³ Our interest in this measure, however, is not because it is accessible but because (as will be seen) it shows strikingly wide individual differences, a significant course of growth in relation to puberal maturing, and a well-defined relationship to other motor traits.

The earliest important study presenting age norms of manual strength for both boys and girls is that of Smedley (35), who obtained records of over six thousand children in Chicago public schools. Figure 1 presents age means from this investigation, with right-hand strength expressed in kilograms. The figure shows similar growth curves for boys and girls up to the age of 14, but with a sharp separation thereafter. The period of most rapid growth is between twelve and thirteen for girls and between fifteen and sixteen for boys. Especially for boys, the total absolute gain is striking; at age eleven boys are twice as strong as at six, and by sixteen their manual strength has doubled again. Since few characteristics show a comparable rate of growth within this age

² Cf. Jones (15, chaps. vi, x).

³ Various types of hand dynamometers have been developed. Those in most common use at the present time are the elliptical Collin dynamometer, and the Smedley; the latter has the special merit of a handle adjustable to hand size. A number of studies have made use of the so-called "Universal Dynamometer," developed for measuring the strength of a large number of muscle groups (37). A less expensive and more portable equipment has been devised by Martin (20), for specific muscle groups of the arm and leg. Dynamometers with various accessory equipment are available for measuring arm pull, arm push, leg lift, back lift, etc.

range, the question can be raised as to whether strength may not serve as an exceptionally sensitive indicator of phases of maturing. To check this hypothesis, we may turn to more recent studies which permit a comparison between strength and other growth data.

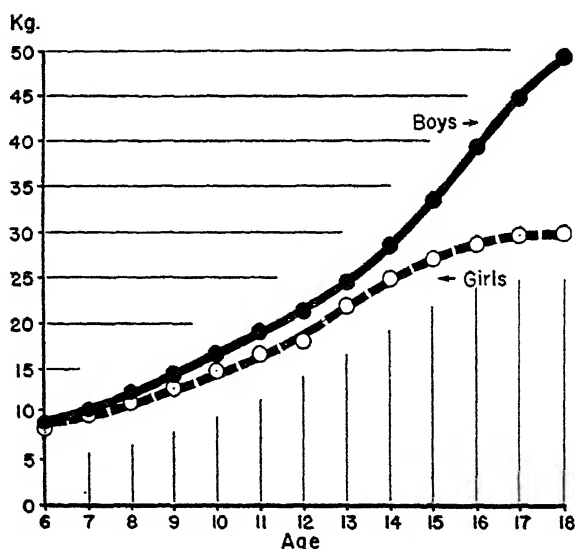


FIG. 1.—Growth curves of strength of grip (Chicago, 1901).

In 1935 Meredith (24) published results from a series of eighteen anthropometric measurements which had been obtained for white males in Iowa City; approximately five thousand records of manual strength were included, the scores being based on two trials for the best hand. Figure 2 compares results from Meredith's series with age means based on a similar sample of Iowa City girls (Metheny, 26). Essentially similar patterns are shown by the curves in Figures 1 and 2.⁴ As in the Chicago data, recorded more than thirty years previously, the maximum gains are in the thirteenth and sixteenth years for girls and boys, respectively. This lag of three years, when boys are compared with girls, is greater than is ordinarily found for growth curves in physical dimensions (cf. pp. 39, 49).

⁴ The absolute levels, for both boys and girls, are somewhat higher in the later than in the earlier study. The average strength level reached by the Chicago boys at, for example, 16 years, was equalled by the Iowa boys at 15.1 years. Boys of the California Adolescent Growth Study reached the same level, on the average, as early as 14.5 years. These differences may, however, be influenced to some extent by differences in procedure and in the instruments used.

The gross body measurement with which strength is most closely associated is weight; such a relationship is not unexpected, in view of the fact that body weight is about 40 per cent muscle. Certain interesting differences occur, however, when we compare the growth of these two characteristics. Table I, taken from Meredith's report (24: 72), shows that among boys the percentage gain increases sharply for both

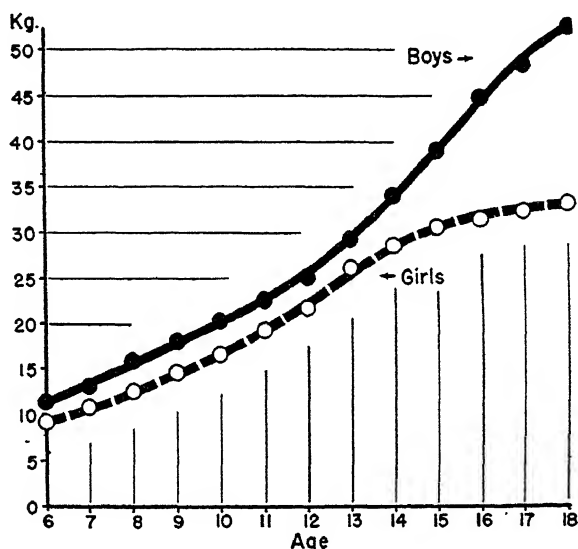


FIG. 2.—Growth curves of strength of grip (Iowa City).

grip and weight at age thirteen.⁵ The percentage gains in strength of grip are at a higher level throughout the age period represented, accelerate more rapidly after the age of twelve, and are maintained for a year longer than is the case with annual increments of weight. Various writers have remarked that during adolescence the rate of functional growth in strength is greater than the rate of anatomical growth in the cross section of muscle. We should not be surprised to find such differences, for strength is influenced not merely by muscular structure but also by neural development, by skeletal factors involved in leverage, and by various nutritive conditions. No doubt a partial explanation of the prolonged growth of strength in boys is in terms of their greater activity and the greater functional use of the new physical powers attained through adolescent growth.

⁵ Percentages are computed by the Minot formula: annual gain divided by the measurement at the beginning of the year.

It is also possible that inherent sex differences may influence the pattern of motor maturing. Wendler (37) has shown that relative to

TABLE I.—ANNUAL PERCENTAGE INCREMENTS FOR BOYS
(MEREDITH)

Age in Years	Grip	Weight
11.....	10.7	8.5
12.....	11.1	9.5
13.....	16.7	12.9
14.....	16.3	11.4
15.....	14.6	13.0
16.....	15.2	6.2
17.....	7.9	7.0
18.....	8.6	3.6

the strength of boys, girls are stronger in the legs than in the arms and hands. For both sexes, Hall (10: 138) long ago pointed out an ap-

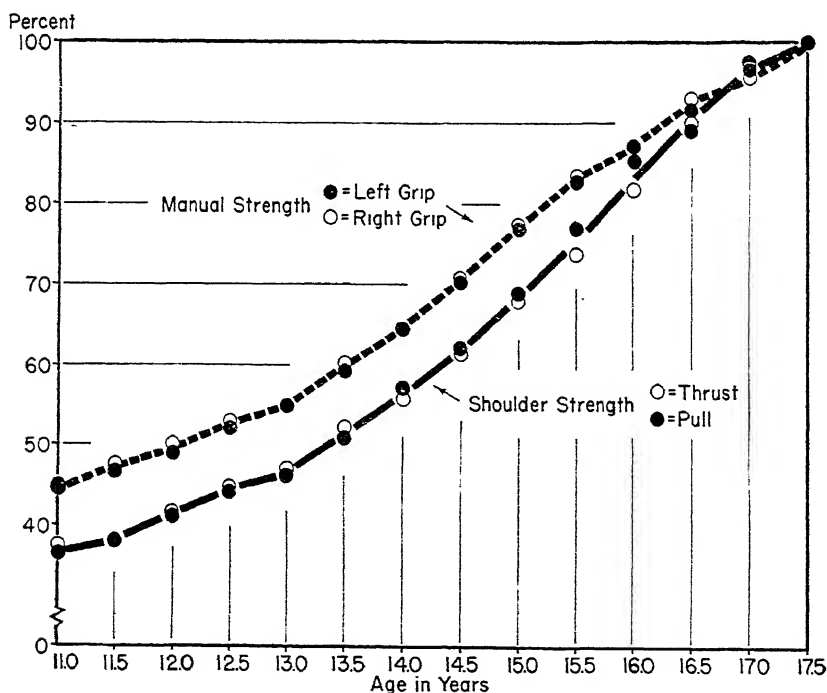


FIG. 3.—Relative scores by age: boys.

parent sequence in which "leg power seems to come first, then biceps and back, the forearm . . . later." This sequence, together with the

varying degree of sex difference in different muscle groups, may help to explain some of the developmental discrepancies which are noted in studies of strength in boys and girls.

Figures 3 and 4, from Jones (16), illustrate growth in manual as compared with two aspects of shoulder strength.⁶ In these figures, comparability is attained by computing strength at each age in terms of the percentage of strength at age seventeen and a half. The curves depict relative rather than absolute growth. Among boys (Figure 3) almost

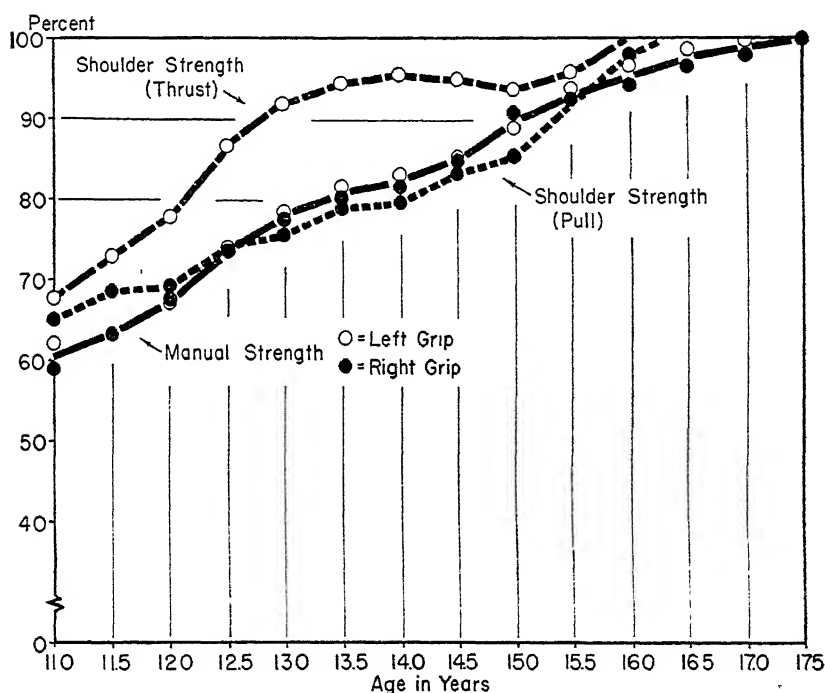


FIG. 4.—Relative scores by age: girls.

identical curves are to be noted for right and left grip; thrusting and pulling strength also exhibit curves similar to each other, but at the beginning of adolescence their *relative maturity* is lower than in the case of manual strength. Thus, at age twelve the boys reach about 50 per cent of the manual strength they are to show at seventeen and a

⁶ "Thrust" is measured with dynamometer resting on the sternum; the subject pushes inward with the two hands, trying to "crush" the apparatus. In the pulling test, the dynamometer is in the same position, but the subject pulls outward, trying to "tear it apart."

half; the comparable value for shoulder strength is not shown until a year and a half later.

As would be expected, comparative curves for the girls (Figure 4) are at a considerably higher level than for the boys throughout the early part of the period shown in these figures. It is a little surprising, however, that the pattern of growth in manual and shoulder strength is so different in the two sexes. In the case of girls, pulling strength matures at about the same rate as manual strength, while thrusting strength matures *more* rapidly, particularly in the year preceding the menarche, and approximates an adult level as early as thirteen years. The thrusting movement is not a thrusting outward, but is similar to claspng. This strength measure is the only one in which girls are not only relatively superior to boys but also absolutely superior (around the ages of twelve and thirteen years). It would be interesting to speculate concerning the biological foundations of this sex difference and the possible relationship to the muscular development supporting the breasts; while at present it is difficult to offer any adequate explanation, we may nevertheless make use of the findings in assessing the "sex-appropriateness" of individual patterns of development.

II. STRENGTH AS RELATED TO PHYSIOLOGICAL MATURITY

In the interpretation of growth in strength our attention is immediately drawn to an exceptionally wide range of individual differences. In Meredith's data (24: 22, 27) the coefficient of variation for grip is from two to five times as great as for any of the reported anthropometric measurements, with the exception of weight. Table II

TABLE II.—COEFFICIENTS OF VARIATION FOR BOYS
(MEREDITH)

Age in Years	Grip	Weight
11	17.6	17.9
12	17.9	19.9
13	20.3	20.1
14	21.6	20.4
15	22.1	19.3
16	19.9	16.3
17	17.0	14.9
18	16.6	14.1

shows, for grip and weight, a systematic increase in coefficients of variation early in the puberal cycle, with a subsequent decline. The

increase and decrease for strength fall about a year later than corresponding changes for weight. The demonstration that strength of grip has a heightened variability during certain ages leads to the inference that within this period boys tend to vary widely in some characteristic closely related to strength. Since the period in question is from thirteen to sixteen years, it would not be surprising to find that physiological maturing is the characteristic involved, and that bodily strength is intimately associated with other growth phenomena of puberty.

Evidence on this point can be seen in Figure 5 from the records of the California Adolescent Growth Study. In this figure growth in right-hand strength is compared for two groups of girls who represent Kg.

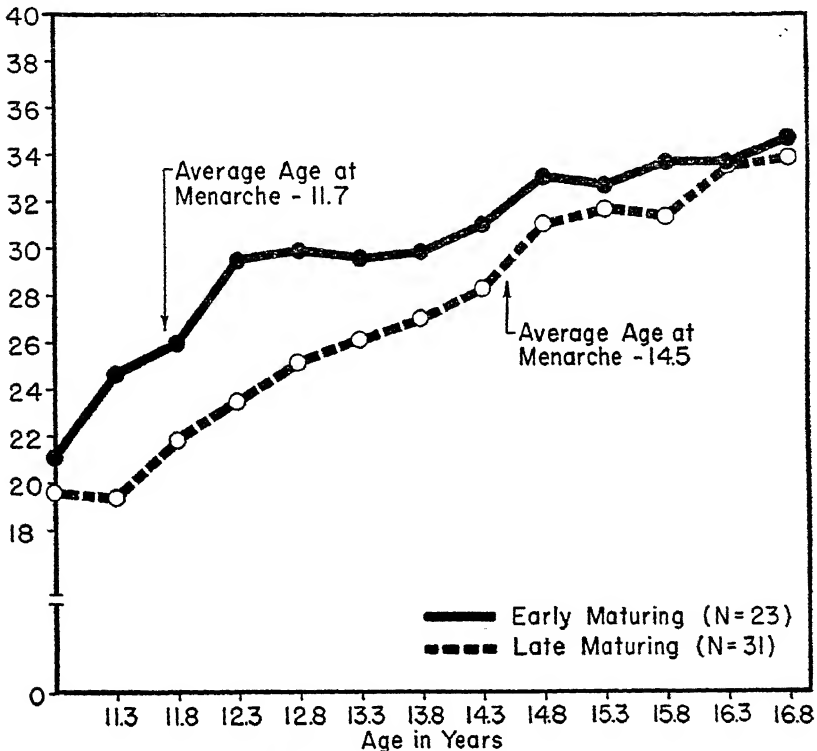


FIG. 5.—Manual strength development (girls) in two maturity groups.

contrasting extremes, within a normal sample of school children, with respect to age at menarche.⁷ It can be seen that the earlier maturing group shows a rapid rise in strength of grip prior to about twelve years,

⁷ Age at menarche ranges from 10.2 to 12.5 in the early group; from 13.5 to 17.0 in the later group.

followed by a slower rate of increase. The later maturing group is relatively retarded in strength, but with a slow and fairly regular growth they eventually reach the level of the others. In each group the greatest increment apparently occurs near the time of menarche.

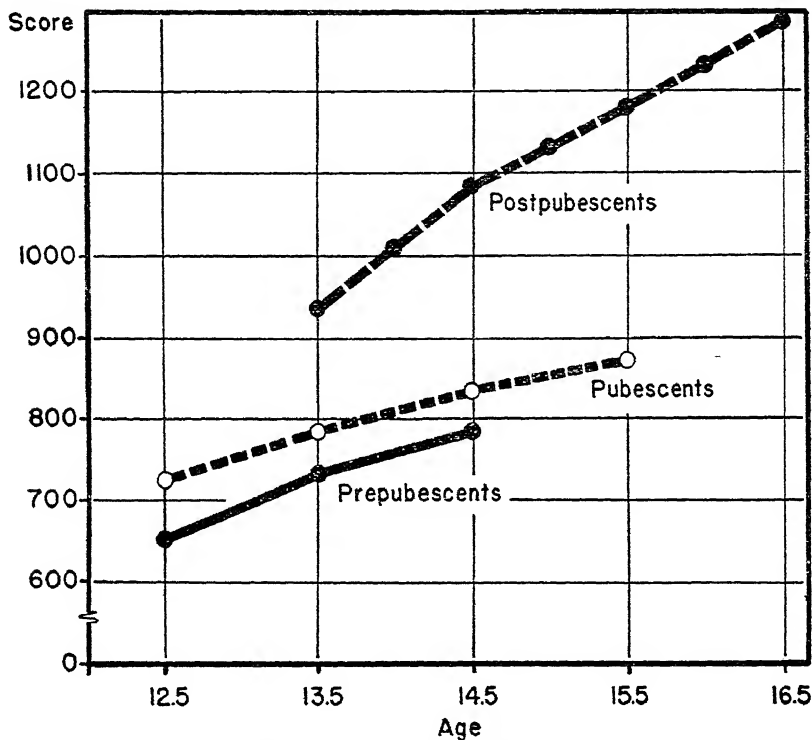


FIG. 6.—“Physical capacity” in relation to age.

Among boys, Dimock (8) has compared, at successive ages, the performance (misnamed “physical capacity”) of three different groups classified according to pubescence.⁸ The scores were a composite of measures included in the Rogers Strength Index (cf. p. 112). Based on Dimock’s results, Figure 6 shows clearly that physiological factors influence strength measurements.

The distribution of the sexual maturity groups, in relation to age, is indicated in Figure 7. In this figure, the proportion of prepubescent boys, referred to the left-hand axis, is shown as decreasing from nearly 100 per cent at ten and a half years to nearly zero at sixteen years.

⁸Based on Crampton’s criteria. Pubescence is marked by the appearance of pigmented hairs in the pubic region, postpubescence by the appearance of a kink or twist in the pubic hair.

The combined proportion of pubescent and post-pubescent boys, the latter referred to the right-hand axis, is shown as increasing from approximately zero to 100 per cent, within the same age range. In view of the fact that in the age range from eleven to sixteen years any given age group of boys is so heterogeneous with regard to maturity,

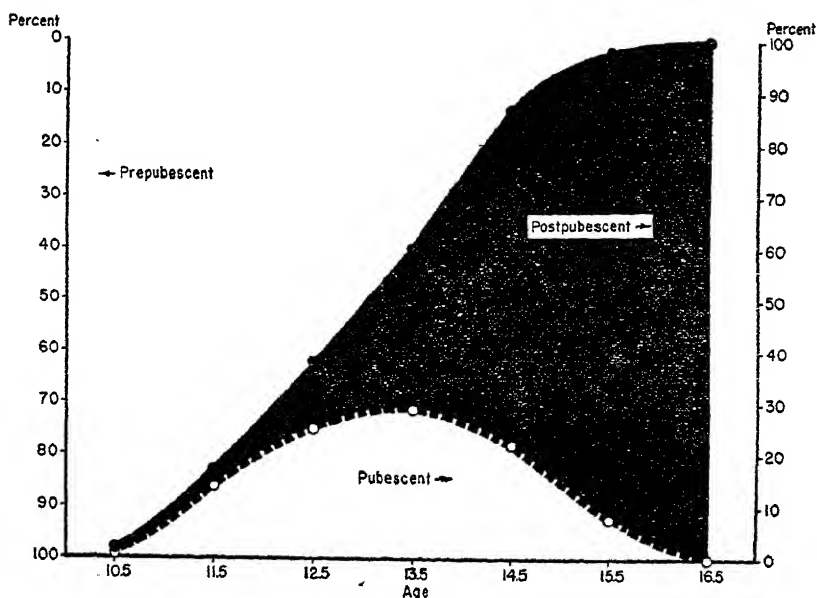


FIG. 7.—Maturity classifications by age.

and also in view of the effect of this factor upon strength, it is apparent that strength records should be assessed not merely with reference to age but also with reference to physiological maturity. Body build is also a relevant factor, since different norms will apply to individuals of a strongly "mesomorphic" constitution⁹ than to those who are less muscular in physique.

More direct evidence concerning the relationship of strength to physiological factors can be found in Shock's (34) analysis of growth in strength as related to the urinary output of creatine. The amount of this substance in the urine¹⁰ tends to increase in early adolescence.

⁹ Cureton (6), using the classifications which have been made familiar by Sheldon *et al.* (33), found that most athletic performances involving strength and power give the highest scores to the "mesomorphs."

¹⁰ In a single determination the concentration of creatine is affected by individual differences in water intake and excretion; this factor, however, can be eliminated if the creatine is stated in terms of its ratio to the creatinine present in the same urine specimen.

Sexual maturity, however, brings an improved ability to utilize or otherwise dispose of creatine, so that it is no longer found when the urine is analyzed. Figure 8 shows that this chemical indicator, directly related to physiological changes during puberty, is also related to muscular strength (strength of grip) when plotted in terms of successive increments.

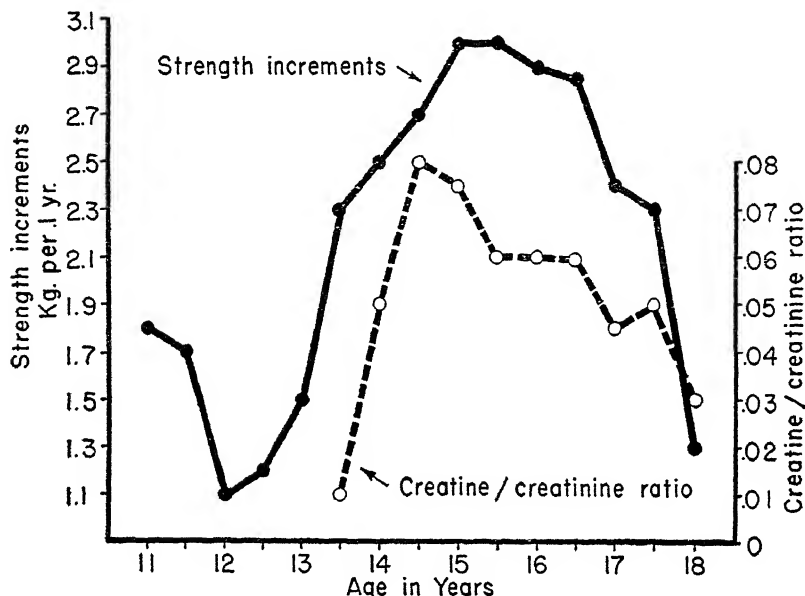


FIG. 8.—Strength increments as related to creatine excretion.

III. DEXTRALITY IN STRENGTH: RELATION TO MENTAL ABILITIES

Some interest attaches to the study of dextrality, involving assessments of the relative strength of the right and left hand. Metheny (27) has reported a marked increase between the ages of three and six years in the proportion of children for whom the right hand is stronger. This agrees with the writer's findings as to age changes in the use of the two hands and suggests the probable role of practice in influencing muscular development. With reference to later childhood and adolescence, Woo and Pearson (38) have asserted that the ratio of right- to left-hand strength remains constant at all ages, and hence is *relatively* greater at the early ages.

Although, at a given age, "the relationship between intelligence and gross motor functions is close to zero in any fairly homogeneous school population" (13: 114), a relationship has been claimed between in-

telligence and the degree to which one hand is dominant. Thus, Smedley (35) asserted that the brighter are more unidextrous; and this is in line with Mead's (23) finding that the feeble-minded are less likely to show functional differentiation between the two hands. No simple interpretation can be offered for these results. In cases of birth injury or other trauma involving neural lesions which have disturbed the normal development of lateralization,¹¹ one might expect that this pathological factor would also produce, on the average, some slight impairment of mental abilities. Among the primary feeble-minded, a lack of right-left difference may be expected on the ground that mental defectives are in general more sluggish in the differentiation of motor as well as of mental functions. Lack of motivation and of understanding of the test procedure may also tend to reduce obtained differences. However, within a normal range of school children the general outcome of studies of physical-mental relationship (Jones: 13: 113; 14: 96) would lead us to expect no more than a low relationship between intelligence and either strength or right-left ratios in strength. In the California study, approximately zero correlations were found between Terman Group Test scores and the dextrality ratio.

IV. DYNAMIC STRENGTH

If grip measurements have been unduly emphasized in the preceding discussion, this is chiefly because of the greater amount of available information on this aspect of strength. Manual strength is, however, fairly representative of strength measurements of the general type known as "static dynamometric" strength. Among boys within a single grade range in junior and senior high school, Madsen (19) has reported correlations ranging from .50 to .82 between right grip and a series of arm, leg, and back strength measures.¹² For men of college age, right grip is one of the chief components of a scoring formula proposed by Larson (17), on the basis of a multiple-factor analysis of a variety of strength data. The equation which he devised uses a weighting of about one-third for right grip, two-fifths for arm pull, with the remainder of the measurement based on leg strength and on strength as represented in the shot put.

Another aspect of strength, referred to as "dynamic strength," is represented in tests which involve propulsion of the body, as in the vertical jump, the standing broad jump, and also in the familiar gym-

¹¹ Dominance of one cerebral hemisphere (normally the left) over the other hemisphere, as expressed in handedness or in speech functions.

¹² Slightly lower correlations are found for single chronological-age groups.

nasium tests of chinning, push-ups on the parallel bars, etc. For classification purposes in physical education, various combinations of tests have been presented in test batteries. The first of these to be generally known was the Intercollegiate Strength Test, developed by Sargent (31) prior to 1900.¹³ With a new scoring system, this battery was revived and popularized by Rogers (30) during the decade beginning in 1920 and has been widely used under the name of the Rogers Strength Index. Other similar combinations of strength tests have been suggested by McCloy, (21), Cozens (5), Larson (17), MacCurdy (18),¹⁴ and others and have been studied intensively with reference to their interrelationships and their efficiency in predicting general athletic ability. Factor analyses of athletic abilities have usually resulted in the announcement of factors which would be expected on common-sense grounds: strength, speed, and co-ordination; in some combinations of tests the factors of endurance, "dead weight," and "motor educability" also emerge.¹⁵

It is well known that the strength factor in athletic ability is more closely related to dynamic strength (as tested, for example, in jumping, chinning, and "dipping") than to dynamometer measurements. This is to be expected, since the latter deal with special muscle groups, while the former involve the movement of the whole body and are more similar in nature to the feats of agility represented in many athletic events.

Among high-school girls, Powell and Howe (29) have reported that grip has a greater predictive efficiency than back lift, leg lift, "push-ups," or "pull-ups," but in indicating athletic ability no combination of these is as effective as a battery including performances such as broad jumping and hurdling. These writers suggest that:

[Motor tests are of value in physical education chiefly because they enable an instructor] to locate both the markedly superior and markedly inferior

¹³ This consisted of right and left grips, back strength, leg strength, "pull-ups" and "push-ups". Vital capacity was also included.

¹⁴ MacCurdy combined the Sargent (vertical) Jump with a modified form of the Rogers strength test. An index of what he termed "physical capacity," based on this battery, yielded a correlation of .86 with a series of athletic performances among sixteen-year-old boys.

¹⁵ In a recent classification of physical abilities, Cureton (7) has suggested the following conceptual distinctions: (a) strength, the capacity to exert force; (b) power, the capacity to release explosive force in sudden violent effort; (c) endurance, the capacity for continuous exertion; (d) agility, the capacity for fast reaction in controlled nimble movements; (e) flexibility, capacity to move easily in the full range of joint movements (grace, suppleness), and (f) balance, neuromuscular control paralleling the development of the kinesthetic sense.

pupils early in the season. She can therefore adapt her teaching to their needs as well as to the needs of the majority in the class. Special help can often be given to students of low motor ability without forming an "awkward squad" and thereby reducing the opportunity to learn from more skilful classmates. Psychologically it is an advantage to put at least part of the physical education program on an objective basis, measuring the initial status and progress in terms that are not influenced by personal opinion. Care must be exercised, however, to avoid undue emphasis upon individual deficiencies when the chief task is to offer encouragement and to stimulate more frequent and effective participation in activities (29: 88).

Few developmental studies have been made on functions involving dynamic strength. The most important of these is reported in the monograph by Espenschade (9), who presents longitudinal data showing adolescent changes in a series of track events.

Figure 9 presents age curves for boys in these tests, recomputed by the writer so as to be comparable with each other and with the curves in Figures 3 and 4. The average performance at seventeen years and three months was used as a base, and calculations were made to determine the percentage of this performance level reached at preceding ages.¹⁶

While the age curves in Figure 9 involve a smaller relative gain during the adolescent period than the curves for dynamometric strength, they agree in showing that in the case of boys the most marked increments in physical performance occur, on the average, *after* the age of fifteen years. Comparable curves for girls have not been drawn, since after the age of thirteen girls manifest few changes in these functions which may be ascribed to chronological age. In the fifty-yard dash and the broad jump, the girls in Espenschade's sample showed an actual decrement rather than a gain, after an average age of thirteen years and three months. The only function in which the girls exhibit a substantial gain from thirteen to sixteen years is the vertical jump; their averages increase from 10 to 11.6 inches. Over the same three-year period, the boys increase from 12.2 to 16.3 inches. In these functions, as in the strength measurements reported on p. 108, growth is related to physiological maturing. This is shown, for example, in Espenschade's results, in which the test scores of boys were in most functions found to correlate higher with physiological age than with chronological age.

¹⁶The standing broad jump, vertical jump (jump and reach), and distance throw of a baseball were scored in linear units. The fifty-yard dash was scored in terms of time; for the present purpose, these scores were changed to linear units by computing the average distance covered per second.

In a number of studies it has been noted that dynamometric-strength tests show a poorer correlation with athletic performance among girls than among boys. The reason for this appears to be that, in the case of girls, dynamometric strength follows a course of growth which reflects maturational changes during adolescence, whereas dynamic-strength tests tend to follow a different course; the failure of such functions to continue their development after the age of about thirteen is an interesting aspect of the differentiation of the sexes. Sex

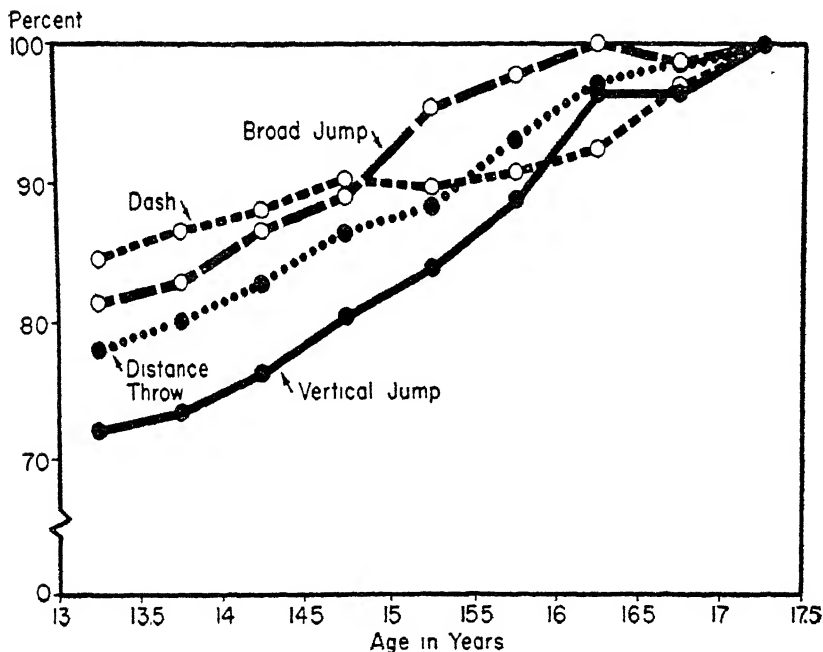


FIG. 9.—Relative scores by age: boys.

differences in muscular maturation, in the relation of muscles to body weight, and in the development of skeletal structures, undoubtedly play a role in determining the sharply widening differences between boys and girls which after the age of eleven or twelve years are apparent in traits involving jumping, running and throwing. Biological differences, however, do not offer the whole explanation, for in our society they are accentuated by differences in cultural expectation, in motivation and practice. This problem will be considered more fully in a later section dealing with physical-activity interests in relation to social adjustment.

V. MOTOR ABILITY AS MEASURED BY THE BRACE TEST

A motor-ability test introduced by Brace (3) in 1927 was described by him as measuring an ability which is "more or less general, more or less inherent, and which permits an individual to learn motor skills easily and to become readily proficient in them."¹⁷ The Brace series includes a variety of tests of gross bodily co-ordination and acrobatic agility, such as "walking in a straight line, heel to toe," "jumping one foot through a loop made by grasping the other foot in the opposite hand," "jumping into the air and slapping both heels with the hands."

Other factors in addition to motor learning are, of course, involved in such tests, but they are relatively independent of strength and of general athletic ability. Age changes in performances measured by the Brace test are less conspicuous than in other motor performances discussed above; thus, Espenschade (9) found that among boys within an age range from twelve and a half to seventeen and a half years, the Brace test correlated only .27 with chronological age, while the broad jump and the vertical jump yielded correlations of .71 and .53 with age. Dimock (8) has maintained that the smaller dependence of the Brace test upon age is due to lag in this aspect of growth in the second year of postpuberty. A related observation was made years ago by Gulick,¹⁸ who stated that "near the dawn of puberty a distinct decline occurs in the power to climb and hang and otherwise move the body by the use of the hands."

From Dimock's data, the writer has prepared age curves, presented in Figure 10, which show a comparison in the Brace test records of growth for those who are prepubescents and those who have already reached or passed the pubescent phase. Contrary to the results for strength (Figure 6) it is apparent that if boys of a given age are prepubescent they will do better on the Brace test than if they are physiologically more mature. Dimock has related this anomaly to "adolescent awkwardness," but has pointed out that it is not due to a disproportionate physical growth in that particular period, since the lag in motor development occurs at a time when an accelerated growth in height is first beginning; the phase of most rapid growth in

¹⁷ The Brace test has sometimes been described as measuring "motor educability," or aptitude for motor learning. This claim covers too much ground, since its power to predict learning scores applies to only a limited group of motor functions. The Johnson test (12, 25), is probably more effective for this purpose, but because of the time required to administer it, has been less widely used in testing programs.

¹⁸ Quoted by Hall (10: 138).

height is marked by a resumption of more rapid development in the functions measured by the Brace test.

The data in Figure 10 are based on seventy-two prepubescents at age twelve, the group diminishing to thirty at age fourteen. The pubescents and postpubescents include nineteen cases at age twelve, the number of cases increasing to one hundred at age fifteen. It is difficult to ascertain the role of sampling factors in determining the differences shown. Partial confirmation of Dimock's results is to be found, however, in the present writer's analysis of growth in motor ability (Brace test) as related to skeletal age. Boys tend to show a lag or even a recession in growth at around the skeletal age of four-

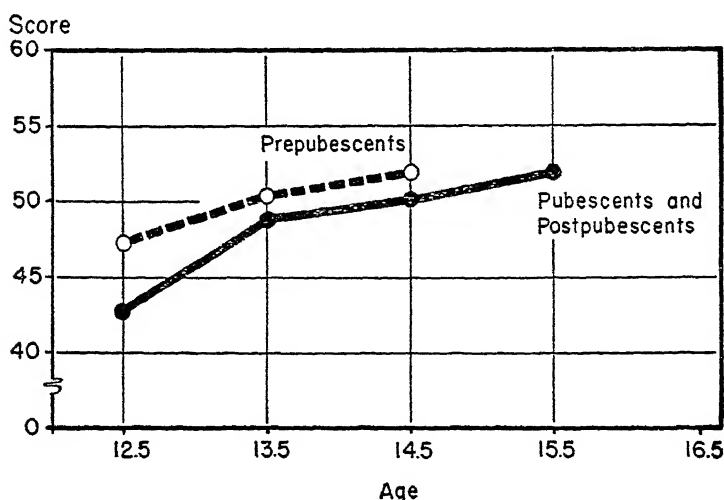


FIG. 10.—Brace test scores in relation to age.

teen years. This is a time when a large proportion of boys are becoming postpubescent. At a skeletal age of about fourteen and a half years a renewed motor development occurs, as measured by the same series of tests.

It would thus appear that with the onset of puberty the development of certain types of co-ordination, balance, and agility is in some cases temporarily retarded. While the factors determining this change in the rate of growth are complex and not easily identified, it is not surprising that some aspects of body functioning as well as of body growth are subject to cyclical changes.

VI. PHYSICAL ABILITIES AS RELATED TO SOCIAL FACTORS

It is chiefly with boys that physical abilities play an important role in social adjustment. With the coming of puberal changes, girls tend to lose interest in active games and in the display of various forms of athletic prowess. A number of socially approved sports, such as tennis, golf, swimming, and skating, retain a favored position in the feminine culture, but as a rule these persist more largely on a social basis than in terms of the prestige value of skill in competitive situations. Among boys, however, competitive athletic skills are among the chief sources of social esteem in the period preceding maturity.¹⁹ The extent to which this is true varies, of course, in different regional groups and at different cultural levels. Thrasher (36) has pointed out that in gang activities particularly, physical prowess, backed up by daring and "gameness," is an important component in leadership.

The adolescent preoccupation with physical activities has been described in the following terms by Partridge:

Watching a group of adolescent boys carrying on under their own direction, one cannot help being impressed with the number of different situations that arise where physical skill is displayed. Tussling, running, jumping, and wrestling are going on constantly. These informal contests are sure to result in intimate knowledge of each other's physical prowess (28: p. 131).

The generally favorable status of the athlete is illustrated in a study by Bower (2), who determined the correlations between the popularity of seventh- and ninth-grade boys, and their standing on various measures of ability, social status, and reputation. He found that popularity was unrelated to intelligence, height, home ratings, or school achievement, but was significantly related to strength and to physical ability as measured by a series of track-event tests.

These relationships would seem to be due not merely to the high premium which adolescents place upon athletic proficiency, but also

¹⁹ Adolescent interests in physical activities have been recorded in many investigations, concurring in general with the following early study cited by G. Stanley Hall: "Of two thousand children familiar with two hundred kinds of amusements, those involving physical exercises predominated over all others; . . . at every age after the eighth year they were represented as almost two to one, and in the sixteenth year rose among boys as four to one" (10: 210). The nature of preferred physical activities undergoes considerable change during adolescence; the *number of different* activities declines, and there is a notable falling-off of less organized games and relatively unskilled types of play. At sixteen or earlier an increase is to be noted in "spectator-sports," at the expense of actual participation. Athletic distinction is more highly touted at this time and the lines are more sharply drawn between performers and lookers-on.

to the fact that strength and other aspects of physical ability are closely joined to such favorable traits as activity, aggressiveness, and leadership (cf. 225-31). Bower found that some adolescents achieved popularity even when low in physical ability, but that these were invariably cases in which some strongly compensating factors were present, such as an exceptional degree of enthusiasm, friendly sociability or aggressive enterprise.

Cowell (4) is also among those who have studied the relationship between interest and proficiency in games and prestige among classmates; in his phrase, those who were "fringers" in playground activities (as judged by physical-education teachers) were also socially less acceptable and often marked by negative traits which seemed to offer an unfavorable prognosis for future adjustment. In the interacting relationship that is here implied, the child with negative and withdrawing traits is unfavorably regarded by his classmates; his failure to participate in physical activities increases his poor reputation and at the same time, through lack of practice, he falls further and further behind his classmates in those very characteristics that are needed to maintain status. Moreover, the child who seeks to participate but is unable to do so because of lack of skill may be forced to take refuge in withdrawal as his only defense against conspicuous social rejection.

Among adults it is often difficult to realize what it means to an adolescent when through illness, late development, or other factors, he is unable to play a usual part in the physical activities of his fellows.²⁰ Such a boy may turn his interest to other goals. It is a critical question whether, in so doing, he will lose contact with his classmates, or, on the other hand, will find a socially adequate use of such favorable traits as he may possess. When it becomes feasible for the teacher to provide guidance in such situations, the adolescent appraisal of physical prowess need not be accepted as an inevitably sound scheme of values. In helping the individual child to adjust to the frame of reference in which he finds himself, the teacher may also remain aware of wider responsibilities. A preoccupation with physical achievement, during

²⁰ Another aspect of physical inadequacy, often obscure both in its origin and in its expression, has been discussed by psychiatrists who point out a possible relationship between motor difficulties in infancy and later anxiety states. Schilder (32), for example, reports clinical evidence that "unsolved motor problems" (such as lack of security in equilibrium) may lead to persisting emotional disturbances. On the positive side, a number of investigators have pointed out the value of specific motor training in the treatment of early personality difficulties, such as fears, submissiveness, and attitudes resulting from inferiority feelings (see Jersild, 11: 67).

the period in which this interest is most intense, may be helpful in fostering both the physical and the mental hygiene of the adolescent: the latter, through providing boys with an opportunity to express adolescent aggressions in relatively harmless ways, and also through providing substitute outlets for awakening sexual energies. We should, however, give some consideration to the nature of the society that is best supported or prepared for by a competitive athletic culture in adolescence. If we must look forward to a generation or longer of intensive military preparedness, with the development of "commandos" as the most heroic type of young adult, it is quite possible that physical abilities should receive even more emphasis than they do at present. If our society is to be one in which an aggressive, acquisitive individualism is chiefly sought and rewarded, the competitive training of organized athletics may indeed qualify as ideal "character building." On the other hand, it is possible to conceive of a regime which will be effective in promoting physical conditions and abilities, but which will not exalt these as dominant goals.

In many communities the adolescent boy is exposed to the influence of vested interests based upon spectator sports. A great deal of energy is directed toward developing and exhibiting a few outstanding performers who will enhance the popular reputation of their schools and coaches. The claim is commonly made that this is to the advantage of the average student, for when interscholastic games become a commercially successful business they are able to support less prominent activities; football, for example, helps to subsidize other sports which "do not pay." If, however, education is concerned with promoting the integrated development of each individual pupil, the question can be raised as to the extent to which our present athletic programs are in line with educational aims. With others who have written on this subject, the student of child development is inclined to believe that in this field our chief objectives should be conceived, not in terms of providing new and larger stadia for champions, but in terms of providing informed guidance and wholesome physical activities for students in general. In the case of boys who are temporarily retarded in growth, informed guidance implies an understanding of their individual growth patterns and potentialities. Especially among these boys and among others of subaverage physical talents, the efforts should not be relaxed to provide adequate encouragement and a program of well-balanced training.

In a recent study of one thousand men students entering a middle western university, Cureton (7) has pointed out that a large propor-

tion were deficient in ordinary physical skills; 14 per cent were classified as "soft, flabby, with undeveloped physiques"; 24 per cent could not jump an obstacle waist high; 26 per cent could not chin themselves five times; 42 per cent could not "skin the cat"; 64 per cent could not swim fifty yards. These are not exceptional findings, but are in line with the experience of the army physicians who have repeatedly called attention to the symptoms of physical deficiency found among a large proportion of American youth in the registration for selective service. In finding that large numbers of young men are entering adult life unconditioned and unmotivated to maintain physical fitness, Cureton has offered the conclusion that "physical-training programs are not compensating rapidly enough for urbanization with its associated mechanization, indoor work, dependence on motor vehicles, and lack of necessity of hard physical work in youth" (7: p. 69).

In the absence of adequate comparative data as to the youth of earlier generations it may be wise to reserve judgment as to whether current cultural conditions are setting up a trend toward physical deterioration. Other evidence, from anthropometric studies and from health and mortality data, would seem to contradict this. But we cannot doubt that a more effective use could be made of our knowledge and facilities for physical training, if these were directed more consistently toward the whole population of our schools.

REFERENCES

1. BOVARD, J. F., and COZENS, F. W. *Tests and Measurements in Physical Education*. Philadelphia: W. B. Saunders Co., 1938 (second edition). Pp. 427.
2. BOWER, P. A. "The Relation of Physical, Mental, and Personality Factors to Popularity in Adolescent Boys." Doctor's Dissertation, University of California, 1940. Berkeley, California: University of California Library.
3. BRACE, D. K., *Measuring Motor Ability*. New York: A. S. Barnes & Co., 1927. Pp. 138.
4. COWELL, C. C. "An Abstract of a Study of Differentials in Junior High School Boys Based on the Observation of Physical Education Activities," *Research Quarterly*, VI, No. 4 (1935), 129-36.
5. COZENS, F. W., and OTHERS. *Physical Education Achievement Scales for Boys in Secondary Schools*. New York: A. S. Barnes & Co., 1936. Pp. 161.
6. CURETON, T. K. "Body Build as a Framework of Reference for Interpreting Physical Fitness and Athletic Performance," *Research Quarterly*, XII (1941), 301-30.
7. ———. "The Unfitness of Young Men in Motor Fitness," *Journal of the American Medical Association*, CXXIII (1943), 69-74.
8. DIMOCK, H. S. *Rediscovering the Adolescent*. New York: Association Press, 1937. Pp. xx + 277.

9. ESPENSCHADE, A. *Motor Performance in Adolescence*. Monographs of the Society for Research in Child Development, Vol. V, No. 1. Washington: National Research Council, 1940. Pp. viii + 126.
10. HALL, G. S. *The Psychology of Adolescence*, Vol. I. New York: D. Appleton, 1905. Pp. xx + 589.
11. JERSILD, A. T. "Education in Motor Activities," *Child Development and the Curriculum*, pp. 57-83. Thirty-eighth Yearbook, Part I, of the National Society for the Study of Education. Chicago: National Society for the Study of Education (5835 Kimbark Avenue), 1939.
12. JOHNSON, G. B. "Physical-Skill Tests for Sectioning Classes into Homogeneous Units," *Research Quarterly*, III, No. 1 (1932), 128.
13. JONES, H. E. "Relationships in Physical and Mental Development," *Review of Educational Research*, VI (1936), 102-23.
14. ———. "Relationships in Physical and Mental Development," *Review of Educational Research*, IX (1939), 91-102.
15. ———. *Development in Adolescence*. New York: D. Appleton-Century Co., 1943. Pp. xvii + 166.
16. ———. "A Comparative Study of Four Aspects of Strength." (In press).
17. LARSON, L. A. "A Factor Analysis of Motor-ability Variables and Tests, with Tests for College Men," *Research Quarterly*, XII (1941), 499-517.
18. MACCURDY, H. L. *A Test for Measuring the Physical Capacity of Secondary School Boys*. Yonkers, New York: H. L. MacCurdy, 1933. Pp. 59.
19. MADSEN, L. "Interrelationships among Motor Abilities." Unpublished Master's thesis, University of California, 1937.
20. MARTIN, E. F. "Tests of Muscular Efficiency," *Physiological Review*, I (1921), 454.
21. McCLOY, C. H. *The Measurement of Athletic Power*. New York: A. S. Barnes & Co., 1932. Pp. 178.
22. ———. "A Preliminary Study of Factors in Motor Educability," *Research Quarterly*, XI, No. 2 (1940), 28-39.
23. MEAD, C. D. *The Relations of General Intelligence to Certain Mental and Physical Traits*." Teachers College Contributions to Education, No. 76. New York: Teachers College, Columbia University, 1916. Pp. 117.
24. MEREDITH, H. V. *The Rhythm of Physical Growth*. University of Iowa Studies in Child Welfare, Vol. XI, No. 3. Iowa City, Iowa: State University of Iowa, 1935. Pp. 128.
25. METHENY, E. "Studies of the Johnson Test as a Test of Motor Educability," *Research Quarterly*, IX, No. 4 (1938), 105-14.
26. ———. "The Present Status of Strength Testing for Children of Elementary-School and Preschool Age," *Research Quarterly*, XII (1941), 115-30.
27. ———. *Breathing Capacity and Grip Strength of Preschool Children*. University of Iowa Studies in Child Welfare, Vol. XVIII, No. 2. Iowa City, Iowa: State University of Iowa, 1941. Pp. vi + 207.
28. PARTRIDGE, E. DE A. *Social Psychology of Adolescence*. New York: Prentice-Hall, 1938. Pp. xv + 361.

29. POWELL, E. and HOWE, E. C. "Motor-ability Tests for High-School Girls," *Research Quarterly*, X, No. 4 (1939), 81-88.
30. ROGERS, F. R. *Test and Measurement Programs in the Redirection of Physical Education*. New York: Teachers College, Columbia University, 1927.
31. SARGENT, D. A. "The Physical Test of a Man," *American Physical Education Review*, XXVI (1921), 188-94.
32. SCHILDER, P. "The Psychological Implications of Motor Development in Children," *Proceedings of the Fourth Institute on the Exceptional Child*, pp. 38-59. Langhorne, Pennsylvania: Child Research Clinic of the Woods School, October, 1937.
33. SHELDON, W. H.; STEVENS, S. S.; and TUCKER, W. B. *The Varieties of Human Physique*. New York: Harper & Bros., 1940. Pp. xii + 347.
34. SHOCK, N. W. "Creatine Excretion as Related to Muscular Development." Unpublished manuscript, Institute of Child Welfare, University of California.
35. SMEDLEY, F. W. "Report of Director of Department of Child Study and Pedagogic Investigation," *Forty-sixth Annual Report of the Board of Education*, pp. 47-116. Chicago: Board of Education, 1900.
36. THRASHER, F. M. *The Gang*. Chicago: University of Chicago Press, 1927. Pp. xxi + 571.
37. WENDLER, A. J. "An Analytical Study of Strength Tests Using the Universal Dynamometer," *Research Quarterly*, VI, Supplement, No. 3 (1935), 81-85.
38. WOO, T. L., and PEARSON, K. "Dextrality and Sinistrality of Hand and Eye," *Biometrika*, XIX (1927), 165-99.

CHAPTER VII

THE DEVELOPMENT OF FINE MOTOR AND MECHANICAL ABILITIES

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I. THE ROLE OF MANUAL SKILLS

In the preceding chapter a contrast was presented between "physical abilities" and "fine motor abilities." Although both are expressed within systems of co-ordination which involve the body as a whole, we think of the finer motor skills as being revealed essentially through deftness and accuracy in limited movements. In the evolutionary series various organs have been developed as vehicles of specialized motor adjustments; none, however, are as highly specialized and at the same time as flexibly adaptive as the human hand. The manual skills are not only our chief examples of fine motor abilities, but they are also characteristically human functions which have played an essential and distinctive role in man's cultural development.

This topic is not one that is commonly treated in textbooks, perhaps because of difficulties in the interpretation of current research. Many works on educational psychology do not index the terms "motor ability" and "motor development." It should however be unnecessary to point out that within this area every child faces imperative demands. When these are successfully met the generalized activity of the infant, unwieldy in its motor helplessness, is gradually replaced by a highly efficient system of co-ordinated and adaptive muscular reactions. In adolescence the fine motor skills are perhaps of less evident

importance than the conspicuous physical abilities which (in the case of boys) often play so large a role in the achievement of leadership and prestige (p. 227). But the interests of boys and girls, and their daily tasks, nevertheless comprise many activities in which motor skill is involved to a significant degree. From the buttoning of his clothes and the handling of tableware to the more complex manipulations which he must master if he is to hold his own in a mechanized culture, the child very early encounters a wide variety of motor requirements. Any inability to meet these requirements adequately may result not merely in practical inconvenience but also in acute and cumulative embarrassment, for the child afflicted with awkwardness becomes a ready target for criticism or ridicule. The gangling adolescent who is laughed at for being clumsy or criticized for not being careful is often confirmed in these motor inadequacies rather than aided to overcome them. It is obvious that neither an ashamed self-consciousness nor an attempt to hide a lack of skill by withdrawing from any practice of it will have a favorable effect upon further development in this area.

To the student of child development, motor activities are of interest not merely for their own sake, but also because of their relationship to other aspects of the personality. Thus, it is possible to study motor traits with reference to their artistic, practical, or recreational value as skills, or with reference to features of motor reaction which may, under some conditions, provide clues to deeper characteristics of the individual. Such features may have to do with the preferred rate of motor response when the individual is free to choose his own pace of activity; the restrictive or expansive, inhibited or uninhibited nature of the response; the rhythm, smoothness, and continuity of response, etc. Even though motor skills may be quite specific and independent of each other so far as their efficiency is concerned, numerous studies of motor "style" and motor expressiveness (e.g., 3) have made it apparent that even in simple motor tasks overt behavior may occur which reflects and reveals, in a more or less consistent manner, some of the underlying traits of the organism.

So far as education is concerned, the role of motor abilities would seem to be somewhat narrowly confined to a connection with shop work, laboratory work, arts and crafts, or manual training. That this area of activity has, however, wider relationships and values has been pointed out by numerous writers. Four decades ago Hall described the general educational importance of manual training by observing that

"it lessens the interval between thinking and doing; helps to give control, dexterity and skill . . . ; interests many not successful in ordinary school; gives a sense of capacity and effectiveness, and is a useful preparation for a number of vocations" (15: 174-75). In this eloquent vein he discussed the educational merits of the arts and crafts movement, and the "indigenous household work," now nearly lost, of the old New England farm; perhaps surprisingly he was also able to point to a number of empirical studies, made before 1900, dealing with various aspects of motor development in adolescence.

II. AGE CHANGES IN MOTOR FUNCTIONS

Among the earliest investigations in this field are two studies, often quoted, by Bryan (6) and Gilbert (12). In each of these a variety of motor tests were applied to school children at successive ages, with considerable attention given to "speed of muscular movement" as measured in a tapping test. The data reported by Bryan included records of the speed of finger, wrist, elbow, and shoulder movement. For the first three of these functions (the fourth yielded results similar to the third) the writers have converted the original age means into percentage values of the scores reached in the highest age group (age sixteen). The results for boys are shown in Figure 1. In comparing the three functions it can be seen that they exhibit age gains which are approximately linear to the terminal age and approximately parallel to each other. The outstanding fact is that in proceeding outward from the arm to the fingers, and from larger to smaller muscles, the relative maturity (i.e., the proportion of later performance) decreases at any given age. This may be taken as an illustration of the so-called "law of developmental direction," emphasizing a sequence in maturing, from proximal muscles (nearer the midline of the body) to those in more peripheral position. Similar age curves were obtained for girls, except that at most ages girls were relatively more mature. This was apparent as early as six and seven years, became less evident at eight and nine, and was most conspicuously seen between ten and twelve or thirteen. That is to say, the period just preceding the sexual maturing of girls would appear to be one in which they are maturing in motor functions more rapidly than are boys. In terms of absolute values, the motor performance of girls was close to that of boys at most ages, but tended to fall behind at fourteen and in subsequent years.

In the years since Bryan's pioneer study numerous test procedures have been developed, with much ingenious apparatus for examining

and recording different aspects of motor performance.¹ The inter-relationship of motor and other factors (sense-perceptual, affective, motivational, intellectual) must be taken account of in the attempt to test motor abilities. Actually, of course, the term *motor* is purely a matter of emphasis with respect to a given activity, and in fact the term *psychomotor* is often used to indicate that the other factors are also involved. In a good motor experiment, however, the motivation, the sensory cues, the affective tone, and the intellectual comprehension are all maintained at a relatively satisfactory level, so that differences in scores are not attributable to differences in these factors. Scores obtained under these conditions are primarily a matter of

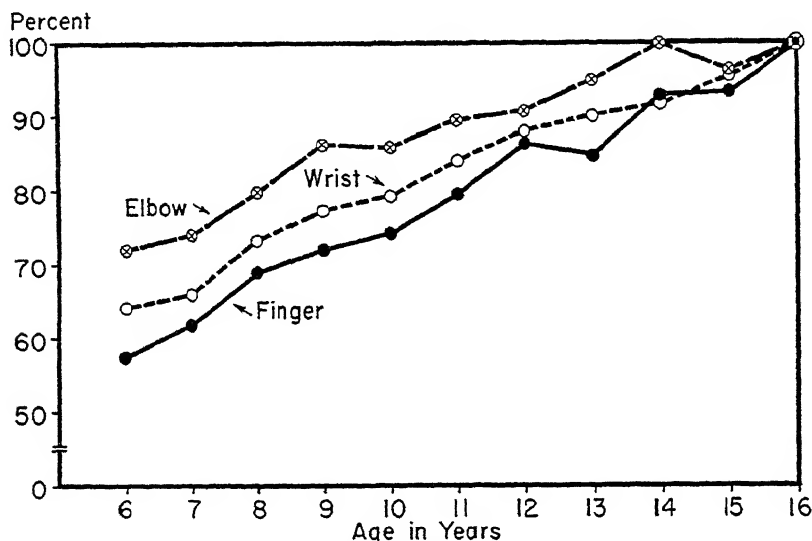


Fig. 1.—Motor development curves in percentage of scores at age sixteen.

effective muscular action as measured by speed, strength, precision, or some combination of these indices; they are only very slightly correlated (if at all) with scores in sensory, intellectual, or other types of tests.

Age changes in a series of motor functions can be observed in Figures 2 to 4, based on data collected by one of the writers in a study of school children² between the ages of eleven and fifteen. The sev-

¹For a discussion of illustrative tests, see Garrett and Schneck (11) and Greene (14).

²The tests were administered, at six-month intervals, as a part of the Adolescent Growth Study of the University of California. For each sex the average number of cases at each age was fifty-four, except in the steadiness test in which the average was forty.

eral tests cannot readily be compared in terms of their raw scores, some of which are in time units and some in performance units. In these figures, therefore, the raw scores in each test have been converted into scaled measures.³

Figure 2 presents age changes in two relatively simple speed tests, the first of which involves reaction time to a sound.⁴ Studies of this function have shown extremely rapid growth in the preadolescent years. Goodenough (13), for example, reports that the average reaction

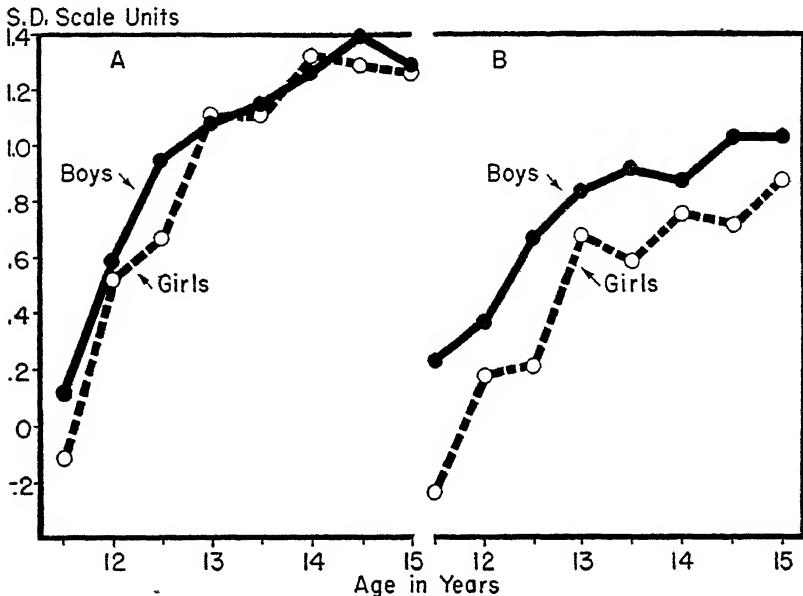


FIG. 2A.—Reaction time to sound. FIG. 2B.—Spatial eye-hand co-ordination.

time to a sound is approximately .5 second at 3.5 years, decreasing to about .2 second at 9.5 years. In Figure 2A it is apparent that a limit of growth is approached at around 13 to 14 years. In time units, the average score at this age is about .15 second, nearly the same as that attained by college students under the same testing conditions (19). A sex difference in favor of boys, reported in the case of younger children (13, 27, 40) is not apparent in the adolescent years. It is pos-

³ The scaling is in terms of the distribution at the initial age (11.5). Taking the average score at this age as an arbitrary zero point, gains in successive years are expressed as fractions of the initial S.D.

⁴ In this test the subject lifts his fingers from a telegraph key when a stimulus is sounded; a Cenco chronoscope starts with the sound and stops with the opening of the telegraph key, thus recording (in 1/120 of a second) the interval between stimulus and response. Fifteen reactions were taken for each hand.

sible, however, that the superiority of boys at earlier ages is due less to neuromotor differences than to a greater interest in mechanical situations and perhaps also to a greater competitive interest. Even such simple functions as reaction time (as measured under ordinary testing conditions) are known to be strongly influenced by incentive and by such factors as are involved in competition and social facilitation. In repeated testing, as in the California study, subjects become fully adapted to the apparatus, and it is more readily possible to provide motivation appropriate to the individual; the situation then becomes more similar to that of an intensive, highly practiced laboratory experiment, and under these conditions it is not surprising that superficial sex differences tend to disappear (19: 193).

Figure 2B illustrates somewhat similar age changes in a function which involves, not the latent time between stimulus and response, but the time of the movement itself: in this case, a precise eye-hand co-ordination.⁵ The sex differences here are more persistent, but they are not large enough to be statistically reliable.⁶

Figure 3A presents results for the Jones synchrometer, involving a different type of serial action in which the required manual movement (pressing a button held in the hand) is not spatially precise but must be temporally synchronized with a rotating disk. In this function the boys are at most ages reliably superior to the girls. Still another eye-hand co-ordination is represented in 3B. On this test (the Brown spool-packer) the two hands must be used simultaneously in packing spools in a tray. Here no consistent sex difference can be seen.

In Figure 4A a function is shown which appears to favor the special abilities of girls.⁷ The serial discriminator (29) employed in this test is an instrument requiring the selection of an appropriate finger movement in response to a series of numbers visually perceived. It is of interest and possibly significant that girls achieve an advantage in a test incorporating a symbolic factor. This is perhaps related to the common finding that girls tend to be superior in language functions to

⁵ The Miles reaction board was used for this purpose. The subject's task is to insert a metal stylus, about the size of a pencil, in a hole of only slightly larger size. In each trial the same act is repeated three times at high speed; the records shown here are based on a total of six trials for the right hand.

⁶ The average critical ratio is 1.4 within the age range twelve to fifteen, with a maximum of 2.5 at 12.5 years.

⁷ The difference is not fully reliable but may deserve attention in view of the fact that within the same sample of cases the girls tend to be poorer than boys on a number of motor functions. In this case the average critical ratio, in the age range twelve to fifteen, is 1.7 with a maximum of 2.5 at 13.5 years.

boys of the same ages. In Figure 4B, the last in this series, a slight, unreliable difference in favor of girls is shown in a function which involves an extreme degree of manual precision and steadiness. The chief point of interest here is the somewhat doubtful and wavering course of improvement shown by the boys, whereas girls exhibit a more definite and steady growth from year to year.

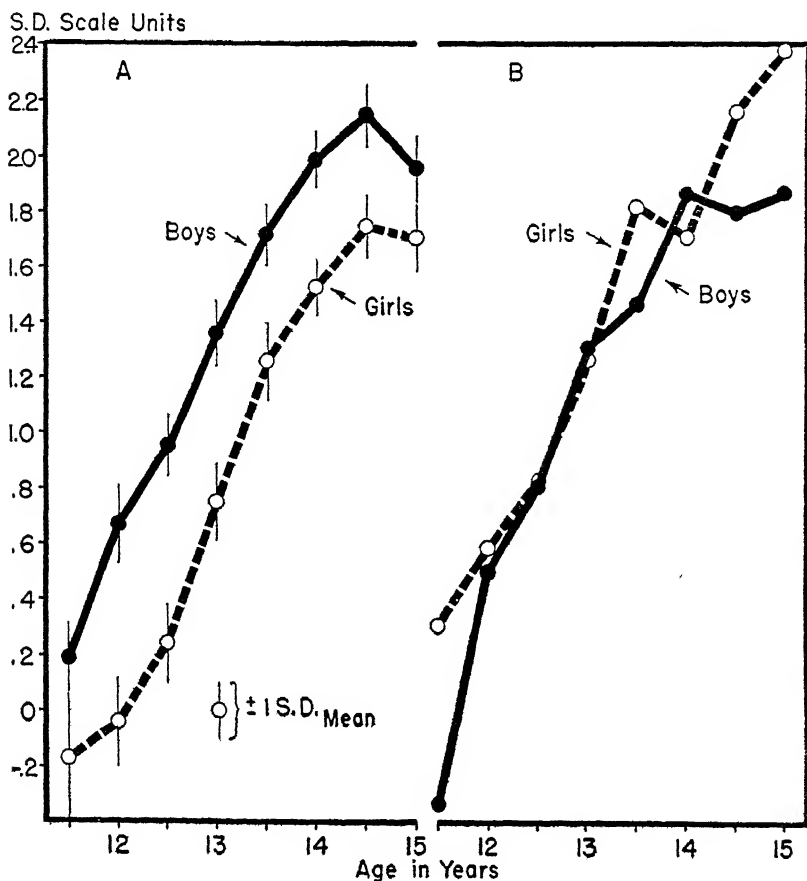


FIG. 3A.—Temporal eye-hand co-ordination. FIG. 3B.—Bi-manual co-ordination.

Although it has often been reported that girls are more inferior to boys in complex than in simple motor functions, it is clear that this principle has some exceptions. Moreover, the reader should bear in mind that even where sex differences are statistically significant, they are considerably smaller in degree than the range of variation within either sex. Thus, in the case of the synchrometer test (Figure 3A),

where the superiority of boys is at a maximum, one-third of the girls equal or exceed the average of the boys of the same ages. This amount of difference, even if universal for all motor functions, would certainly not justify an advisor in suggesting that a given type of skilled motor training be avoided merely because "girls do not take to that sort of thing." On the contrary, our results appear to be principally

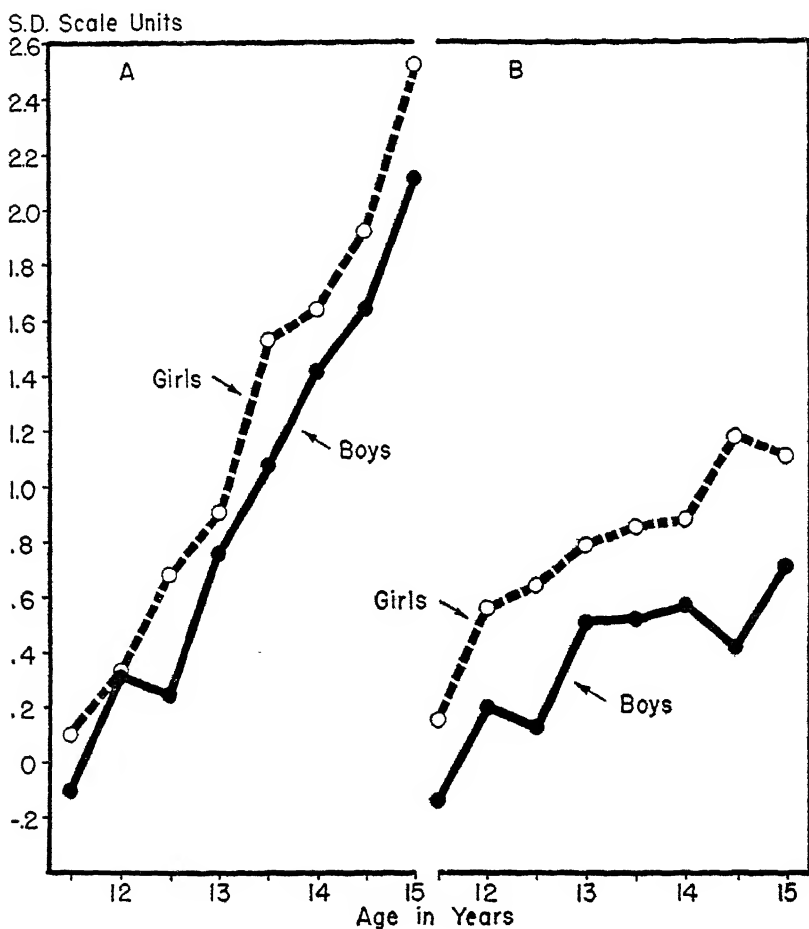


FIG. 4A.—Serial discrimination.

FIG. 4B.—Manual steadiness.

significant in showing that, for the battery as a whole, girls are retarded only slightly if at all as compared with boys, during most stages of adolescence. The current employment of women in many new types of war industrial work substantiates this finding at the

level of complex practical motor skills. Thus, an old prejudice against girls and women in such activities is fast disappearing.

When examined from the point of view of age change, it can be seen that these tests vary considerably in the extent to which they are affected by age.⁸ In reaction time, spatial eye-hand co-ordination and steadiness, the total growth within this age range is relatively small, amounting to no more than about 1 S.D. of the distribution at the initial age. In terms of the same units, however, the growth is about twice as great in temporal eye-hand co-ordination, bimanual co-ordination, and serial discrimination; moreover, in some functions, such as reaction time, growth has apparently reached its limit before fifteen, while in others, such as serial discrimination, the gain is as great at fifteen as in previous years and continued gains may be looked for.

It is apparent from these and similar findings that although there are different rates of development for the various years in each test, there are still no clearly marked age periods at which the rates of motor development increase or decrease sufficiently to warrant the recommendation that individuals start acquiring a particular practical motor skill before or after any given age.⁹ If such advice is to be given it must obviously be on the basis of individual records rather than with reference to universal tendencies.

The question may be raised as to the broader application of these findings in the industrial employment of youth. For the most part, the age curves in Figures 2 to 4 suggest that the manual functions tested reach a limit of growth which is definitely earlier than that of intellectual abilities.

It should, however, be pointed out that tests of this nature involve maximal effort applied during short periods of time; a few minutes at the most. As motor tasks increase in complexity, and as they increase in the demand which they place upon persistent effort and

⁸To a minor extent, practice is also a factor. Control data indicate that the effect of repeated testing is to produce a slightly steeper and longer continued gain in scores than would be found in cross sectional measurement.

⁹Little is known concerning the relationship of manual abilities to physiological age. As in the case of other abilities, there are some indications (in the California study) that the early-maturing boys and girls tend to show somewhat steeper growth curves in early adolescence and tend to reach an earlier plateau. The differences, however, are smaller and less consistent than in the case of strength and gross motor performance. It is not yet known whether any of the finer motor skills show the interruption in growth that has been reported in early adolescence for the Brace test.

upon flexible adaptation of work methods, we may expect that the age limit for top performance, in unpracticed activities, will move forward to twenty or beyond. With motor more commonly than with mental abilities, we may also expect that differences in practice will very readily obscure even wide age differences.

Thus, the results to be derived from the simpler types of laboratory tests cannot be applied immediately to the problem of lower age limits for any specified type of industrial work. The fact that, on the average, boys approach the ceiling of performance in a simple co-ordination before the age of fifteen years (Figure 2B) cannot justify us in concluding that they will be equally mature in integrating this with the other motor requirements involved in learning complex mechanical tasks. Nor can we immediately judge how much special training will be needed to compensate (if it *can* compensate) for deficiencies in maturity. With reference to questions of industrial efficiency and safety, this is a problem which must be examined in terms of the whole operation that is to be learned, rather than by drawing inferences from the measurement of one or two component elements.

In reviewing the implications from Figures 2 to 4, it is apparent that these functions are specific in that they show a variety of age curves and a variation in the degree and direction of sex differences. This leads to the question as to whether such motor tests contain a common factor in any significant degree or whether they represent almost wholly independent functions. If the former is true, the discussion of motor development can be simplified by dealing with a single motor index, while in the latter case it will be necessary to continue developmental analysis in terms of many specific functions. A number of attempts have been made to develop a pattern of motor tests applicable in adolescence. The Oseretzky tests, for example (1, 20, 21, 25), have been widely used in various countries in Europe with the purpose of recording a number of aspects of both fine and gross motor performance, including static and dynamic co-ordination, speed and force of movement, and precision. Co-ordinate as well as separate hand and leg movements are examined. The tests are claimed to have a bearing on physical education and also on the assessment of physical handicaps and of certain types of psychosomatic problems (as in the case of the neurotic or psychopathic child with motor disturbances). Toward this end a "motor quotient" has been devised (1) and erroneously regarded as analogous to the intelligence quotient. Other batteries of tests, such as the Stanford motor skills unit (29), have been used to obtain a *profile* of scores in specific manual abilities, rather

than with the purpose of combining these into a single measure. The greater appropriateness of this procedure can be seen from correlational analyses of fine motor tests, which have consistently shown at all ages that there is no practically significant relationship between such functions except within certain very narrow groups. These "group factors," such as simple reaction time as recorded for left or right hands, are summarized later in this chapter. In view of the specific nature of motor skills it is misleading to speak of a "general motor ability."¹⁰

Before proceeding with more direct evidence on this problem it will be advantageous to define some of the basic concepts underlying the study of all special abilities, lest we add to the current confusion in their use.

III. DEFINITION OF BASIC CONCEPTS¹¹

a) *Skill*. A person's skill in a given performance is his present effectiveness in terms of the results he achieves. Among the factors which contribute to skill are speed, precision, strength, and timing. The definition of skill may also imply that of two persons who attain the same results the one who does so at a lower energy cost is the more skillful.¹²

b) *Ability*. What one is *able* to do in a given performance at a given time represents his ability in that performance. Synonymous with present skills, but often misused in the sense of ultimate capacity.

c) *Aptitude*. Aptitude signifies readiness in acquiring a given skill. An individual's aptitude for a performance is his probable rate or ease

¹⁰ A greater justification exists for the concept of "general athletic ability," since moderate degrees of intercorrelation have been established for various tests of gross motor functions.

¹¹ Adapted from a formulation by R. H. Seashore and A. C. Van Deusen.

¹² A contrast may be noted between movements which involve the contraction against each other of antagonistic muscles, and movements which are accomplished with muscles relatively relaxed. The former, which Stetson and Bouman (39) have termed "tension movements," are likely to involve waste of energy and early fatigue. The latter, which can be described as "ballistic movements" are initiated by the contraction of a muscle group which then immediately relaxes. The antagonistic muscles may not come into play to any great extent, except perhaps toward the end of the movement. Since both groups of muscles are relaxed while the movement is occurring, less energy is expended and less fatigue occurs. This aspect of motor reaction, important though it may be for long-term efficiency, is often neglected since it is not easily observed except through the external indications of "form" in performance. It is in this sphere that the psychologist is likely to look for significant motor correlates of personality traits.

in learning it. This may depend, for example, on favorable bodily structures and functions, favorable methods of approach, and the extent to which training can be carried over from previous similar activities. Interest and motivation cannot be overlooked in assessing aptitude.

d) *Capacity*. A person's functional capacity for a given performance or skill is his maximal, *potential* effectiveness in terms of end results. This must be conceived, however, on the basis of a given work method, with the understanding that if the work method is changed a different capacity may be called into play. It is also assumed that a person will be able to perform at capacity (for a given developmental level) only after he has had *optimal training under optimal motivation*. Since capacity refers to a *potential* limit, it can only be *inferred*, and hence not operationally defined in such a way as to be readily observable. In most cases the concept of aptitude is of greater immediate value.¹³

The role of individual differences in work methods (approach, set, "trick of the trade," technique, etc.) emphasized in our previous definitions, has been elaborated by Seashore (31) to show that the *ways* in which a person uses his biological equipment may be of great importance in determining his abilities or skills in *all* aspects of behavior. A study of the biological factors of inheritance and maturation on the one side, and amount of training on the other side, is obviously incomplete until we specify the kind of work methods in which the individual is to develop. Most of our studies of the relative importance of "nature" and "nurture" have tended to neglect this middle term of the particular work methods employed. Studies of family resemblances (2) in motor abilities, and particularly of twin resemblances, showing a higher correlation among identical than among fraternal twins (5, 23), have pointed to a biological origin of individual differences in these traits.¹⁴ Such a statement must, however, be hedged about with many reservations. If we could measure a "pure capacity" in a specified motor function, it would doubtless be correct to assume that for any individual the performance limit is determined by anatomical and physiological factors. At a given stage of growth,

¹³ The term "talent" is sometimes used in the sense of aptitude and at other times in the sense of developed skill. The two connotations might well be distinguished by the respective adjectives "latent" and "developed" in referring to talent.

¹⁴ The possible importance of biological factors is also suggested by studies which have shown only a very low relationship between mechanical abilities and "mechanical environment" (26: 265).

performance limits of different individuals would be strongly influenced by differences in their heredity. But it must be recognized that with a given amount of training the same individual may achieve very different levels of performance, depending upon the *kind* of work methods used. The whole field of time-and-motion-study engineering is based upon this premise of the importance of work methods, and those psychologists who use the term "human engineering" would do well to carry it over to the rest of human behavior. The great stress placed upon individual differences in the effectiveness of various football coaches is another evidence of the importance of work methods in teaching. This point of view suggests a principle of differential psychology that within certain limits "it isn't so much what you were born with as what you do with it," in which the kind as well as the amount of training is important.

It should also be emphasized that in most cases persons apparently "hit upon" their work methods with only partial insight rather than by deliberately formulating, examining, and checking them. This is most strikingly shown by the great numbers of people who can perform a highly skilled act but can neither accurately describe how they do it nor teach others how to do it. The failures of numerous "All American" football stars to become competent coaches and of skilled workmen to become good foremen are cases in point.

The learning of motor skills may be regarded as consisting chiefly of shifts in work methods of three main types: (1) nearly complete changes from one work method to another, especially during the early stages of trial and error (e.g., arranging tools and materials in the most convenient places, instead of the usual random placement); (2) minor variations within the same general method, especially in the middle stages of learning (e.g., using both left and right hands actively instead of only the preferred hand); (3) overlapping of component parts within the same method so as to secure better speed and timing. Effective overlapping of component acts is one of the most important features of skilled performance. A skilled cook, for example, is not only faster than other persons in preparing each part of a meal, but is also able to carry on several activities simultaneously so that all the dishes will be ready for serving approximately at the same time. The less-skilled person tends to do one thing at a time, and often not in the right order.

When we recognize the possible role of work methods in determining efficiency, we will be cautious in judging what a person *can* do from present indications as to what he *does* do. As a working hy-

pothesis, students of guidance in education will do well to regard motor, mechanical, and industrial aptitude measures as indicators of *present* status, rather than as providing any secure basis for making long-range *predictions*.

The extent to which differential work methods may upset prediction can be inferred from a study by Cox (10), who has shown that in some industrial tasks it is possible to train workers in generalized methods of approach as well as in specific techniques; such workers will not only gain a headstart but will also, with continued practice, draw progressively further ahead of others who are committed to less appropriate work methods. While this principle may apply more conspicuously to motor than to other functions, it is not difficult to find illustrations in other fields. To take a very striking example (pitch discrimination), Wyatt (42) has shown that even the poorest performers in this previously supposed inherited ability are only temporarily handicapped as compared to others; specific remedial training adapted to the nature of each one's difficulty and the level of his starting performance was sufficient to shift these individuals to the upper end of the distribution. In view of these results the negative findings of Stanton (37) may at first seem surprising. According to Stanton, members of classes at the Eastman School of Music achieved no average gain in pitch discrimination (on the Seashore Measures of Musical Talent) as a result of three years of musical education. This is, however, an instance of the lack of transfer from general training in other functions and in no way contradicts the conclusions of Wyatt as to the effectiveness of specific remedial techniques.

It will now be appropriate to examine evidence as to the generality or specificity of motor abilities, assuming such conditions as those under which they are ordinarily examined. Three possibilities may be considered: (1) If it should be found that motor tests are uncorrelated with each other, or exhibit only very low intercorrelations, we would assume that the factors determining each test are highly *specific*. (2) A second possibility is that certain tests which are qualitatively alike (such as two forms of simple eye-hand co-ordination) will show significant correlations among themselves but very little relationship with other tests; in this case we could assume that determining factors are common to a group of tests, and hence we would speak of *group factors*. (3) If, on the other hand, many motor tests were to show significant intercorrelations with each other, we would be justified in speaking of a *general motor factor*. Actually, we find practically no evidence for such a general factor in fine motor skills, but a

great deal of evidence for rather narrow group factors, and always for at least some specific factors in each test.¹⁵

The group factors are not only relatively narrow as to the tests included within each group, but they often exclude tests which at first glance seem logically related. Also, the group factors are only slightly related among themselves (30, 33). Since similarly low intercorrelations have been found at various ages from the preschool child to the adult (30), we may conclude that motor skills are related only within narrow groups at all ages, at least above two years. Buxton and Humphreys (9) have also shown that extensive additional practice upon motor skills tests, supposedly approaching "capacity" performance, does not produce any significant increase in the intercorrelations of fine motor tests. This would seem to remove any possibility that the specific character of motor skills is due to lack of sufficient practice in the measurements usually considered.

In determining the fundamental bases on which the groupings occurred in these factors, it is possible to compare tests which are similar in three respects but vary in a fourth. Thus, the amount of change in intercorrelations, or in the relative rankings of an individual after each type of change, can be taken as an indicator of the importance of that factor in determining skill as measured. Seashore (31) has found that when a change occurred in the musculature (i.e., when an activity such as tapping was transferred from right hand to left hand, or from hand to foot) very little change occurred in the relative rankings of the individual. Slight or moderate change occurred when,

¹⁵ In the most recent factorial analysis of individual differences in fine motor skills, Seashore and various co-workers (33, 34) have reported that the following groups of tests each have their own group factors:

(1) Single reaction times (simple or discriminative; using visual or auditory stimuli; using hands, feet, or jaw; and with movements varying in extent from 1 to 100 mm.).

(2) Two different and only slightly related groups of tapping tests: (a) simple oscillatory movements in one plane of motion, and (b) oscillatory movements in two or more planes which also involved a slightly greater emphasis on accuracy. The extent of movement and the kinds of instruments used in testing were relatively unimportant.

(3) Serial discriminative reaction times (with visual or auditory stimuli; and with finger, arm or foot movements).

(4) Serial pursuit movements (continuous co-ordinations in following a moving target, with several types of target and movement).

(5) Steadiness and precision, including postural sway, arm-hand sway, arm-hand tremor, and rifle sighting movements.

(6) Mechanical assembly tests and tests for the perception of spatial relations (in both paper and pencil tests and wooden form boards; cf. section iv).

with the same musculature, the task required a different *extent* of movement. A moderate change usually occurred when the sense field varied, i.e., when the test involved auditory rather than visual cues. Finally, it was found that moderate to great change occurred (depending upon the similarity of patterns) when shifts were made in the pattern of required activity, i.e., when the rhythmic pattern of a manual movement was altered, or when a shift was demanded from rhythmic to less regular patterns. This fourth variable of the pattern of movement is thus seen to be the major one in determining shifts in individual rankings, a fact which fits closely with our previous emphasis upon the importance of work methods in determining individual differences.

From the narrowness of the group factors among fine motor skills and the great importance of the particular pattern of action called for in each test, it is logical to expect and is, in fact, verified experimentally that very few practical fine-motor skills can be predicted from even a battery of highly reliable motor tests. Thus, from a battery of six motor tests Walker and Adams (41) found no prediction for typing performance after a year of training among Sophomore boys in a high school of commerce. Similarly S. H. Seashore (35) found no predictive value for the same six motor tests against an objective criterion involving a typical factory-machine operation. In these studies the lack of validity could in no way be blamed upon the lack of reliability of tests or criterion measures, nor were there any other obvious qualitative reasons for the lack of relationship. Each was a fair test of the aptitude hypothesis for such work and showed no positive results. Other studies are being made for various industrial skills, but the published experimental results are nearly always negative. The most significant improvements in factory output have usually come from time-and-motion-study changes in work methods, together with the use of appropriate motivational devices.

Among the few clear-cut examples of predicting fine motor skills are those of steadiness tests in relation to rifle marksmanship (18, 32, 36)¹⁶ and of complex co-ordination tests in the selection of military aviation pilots. In neither of these cases is the basis for the success of the selection clearly demonstrated. Certain other skills have shown some correlation with particular motor tests and, if verified by retest on a larger number of cases, should be added to this list. It should be remembered, however, that as in the Walker and Adams (41) review

¹⁶ Steadiness tests do not, however, show any significant relation to piano playing or draftsmanship.

of typing studies, many claimed instances of validity of motor tests have not been borne out in a repetition of the experiment. When tests have been combined in batteries, as in the MacQuarrie mechanical ability tests, correlations up to .50 have been achieved with school grades in certain types of professional training (4, 17, 28) (engineering, and dentistry); this is comparable with the degree of prediction often obtained between intelligence, achievement, or high-school grades and college success in various subjects, but as will be seen in the following section we cannot expect that the addition of mechanical-ability scores will greatly improve the prediction to be obtained from these other sources.

IV. MECHANICAL ABILITIES

Within the field of fine motor skills certain proficiencies in the handling of tools, machines, and other physical materials are roughly grouped together as mechanical abilities. While these proficiencies actually grade into other activities emphasizing sensory, affective, or intellectual factors, e.g., fine watchmaking, aviation piloting, and engineering design, it is usually implied that overt motor-performance is the predominant characteristic of mechanical abilities.

Current tests of mechanical abilities usually emphasize one or more of the following types of functions:

(1) Spatial relationships. The perception and manipulation of spatial relationships may be examined by numerous block-construction tests, or wooden form-board tests in which the subject's task is to fit pieces into holes of varying shapes. Up to about the mental age of twelve such tests are significantly related to verbal intelligence, but above this age differences in comprehension are of less importance in solving the tasks presented, and they become more purely tests of perceptual or manipulative factors. Paper form-boards are also widely used, requiring an imaginary rather than an overt manipulation of geometrical figures, as, for example, in sketching three small triangles to show how they can be turned and placed so as to fit exactly into a larger triangle.

(2) Manipulative speed. This is examined by a variety of simple motor tests involving rapid and repetitive action, as in placing pegs in a pegboard. Such tests are usually so specialized that individuals ranking high in "finger dexterity" do not necessarily rank even approximately the same in placing the same types of pegs in the holes with tweezers instead of fingers.

(3) Mechanical assembly of small, common gadgets. In this type of

test the subject is required to put together (or take apart) a series of common objects such as a monkey wrench, egg-beater, electric light socket, etc. Best known are the Stenquist (38) and Minnesota assembly tests (26), and the I.E.R. assembly test for girls (7, 24). The Minnesota study demonstrated a moderate relationship between assembly and spatial relationship tests, with correlations, among junior high school boys, of the order of .5. In addition to the foregoing, various achievement tests (sometimes used as "trade tests") have been developed to measure technical knowledge of tools, machines, and materials.

Figure 5 presents results from the Minnesota study (26), comparing age changes for two of the principal types of mechanical abilities tests. In order to make the scores comparable, averages of the twelve-year group for each test were taken as a point of origin, and raw scores for successive years were converted into scaled measures in terms of the standard deviation of the twelve-year group.¹⁷

Each of the two tests shows an increase with age throughout the period from twelve to nineteen years; the course of growth, however, is by no means the same, since the assembly test exhibits linear gains while the curve for spatial relations is negatively accelerated beyond the age of fifteen. It is possible that the age norms for these tests slightly exaggerate the scores in the later ages, because of a superior sample at these ages. Even so, it is worth noting that in each test the scores show smaller age changes than are ordinarily found for mental ability scales.¹⁸ It appears, then, that mechanical abilities are, during adolescence, less related to age and less affected by growth changes than is the case with intellectual abilities.

While there are numerous test batteries¹⁹ labeled "mechanical ability," "manual dexterity," etc., there are relatively few evidences

¹⁷ Standard deviations for age groups were not reported in the original study; the value employed here is an approximation, based on computations from percentile tables. The age-group averages were medians from the same tables (26, pp. 339, 345).

¹⁸ Figure 5 shows that the average at nineteen years is about 1.5 S.D. units above the twelve-year average (in terms of the twelve-year distribution). Among intelligence tests the comparable difference is often from 2 to 3 S.D. units. For a comparably drawn figure showing age differences in the several parts of a mental test, see p. 171.

¹⁹ For a recent survey and bibliography, see G. K. Bennett, and R. M. Cruikshank. *A Summary of Manual and Mechanical Ability Tests*. New York: The Psychological Corporation, 1942. Pp. 75.

that any such broad unitary abilities exist, or that the tests are actually measures of aptitude for the prediction of rate or final level of learning complex practical skills such as carpentry, automotive service, or industrial machine operation. The mere fact, for instance, that college-trained engineers score higher than factory hands on the wiggly-blocks test might equally well be due to differences in general intelligence, technical training, or motivation in different socio-economic groups as to any supposedly innate difference in mechanical aptitudes.

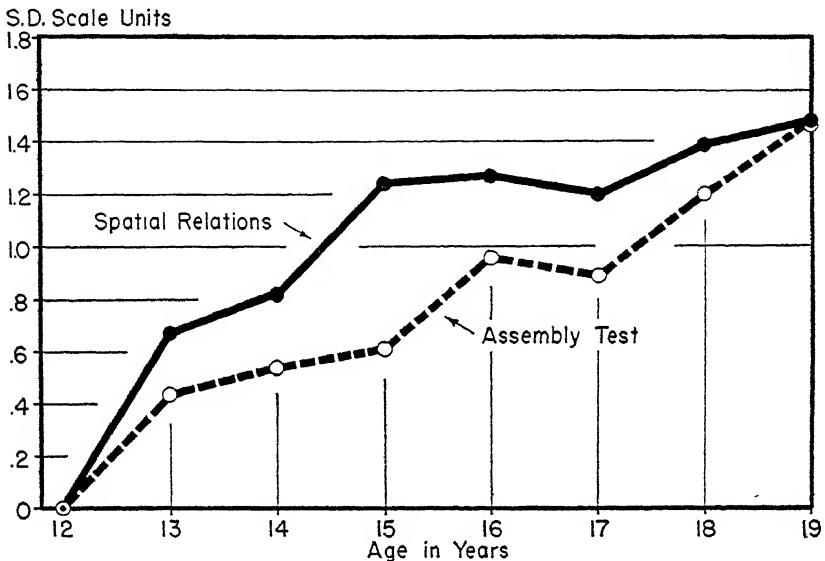


FIG. 5.—Age changes in two mechanical abilities tests.

Likewise the fact that highly skilled workers in a mechanical occupation make higher test scores than do lower-skilled workers may be due to mere differences in training, experience, or motivation. The only conclusive evidence for the aptitude nature of a mechanical test is to administer it to a group of subjects before training and to show that the test scores do predict success as measured by rate of learning or by final levels of achievement after considerable experience in practical work. Unfortunately we have little positive evidence as to the prediction of achievement from tests given prior to training. Considering the large number of tests which have been administered over a period of at least ten years and the great interest in such tests, it seems very strange that we have so little basis for judging their validity.

V. SOME NEEDED DEVELOPMENTS IN MOTOR TRAINING
FOR ADOLESCENTS

Since proficiency in ordinary motor co-ordinations, such as posture, walking, running, etc., as well as special athletic and artistic skills (dancing, music, etc.), can be very important in the personal and social progress of an adolescent, it would seem worth while to make more careful provisions for instruction in these fields. In our current educational plans, training in these motor activities is often left largely to private initiative and expense, except for the already skilled performers who are chosen to play on a team, in an orchestra, or in other units representing the school. If it is desirable for these best performers to receive special coaching in their activities it should be at least equally desirable and perhaps even more important to provide even larger amounts of such coaching for the lower ranking members of the group.

This, of course, does not assume that every person should attempt to develop a high degree of skill in every type of motor activity, but simply that there should be facilities to encourage those who have initial handicaps to develop at least far enough to be able to play a normal role in everyday activities or in informal competition within their groups. Emphasis upon the general principles of good form in an activity can be taught in groups, with special attention to those for whom still more intensive training is necessary.

The emphasis here, as in all teaching, should be upon *diagnostic learning*; that is, once the general purpose and work methods of an activity have been explained and demonstrated, instruction should concentrate upon the detection and elimination of the particular difficulties of each individual which constitute his "bottleneck" toward progress in learning that skill. One of the reasons that so many of our psychological tests show so little influence of practice is that the practice is usually not enlightened by seeing that it is pertinent to the particular difficulty which each person is having at each stage of learning. What Wyatt has shown as to the improvability of pitch discrimination by this method (42) has also been matched by many cases of good informal coaching for manual skills. A person who has a poor initial score in a motor activity is in many cases only temporarily handicapped and if the skill is important to him he can often attain at least normal levels of proficiency by means of remedial training adapted to the nature of his difficulties.

With our constantly increasing proportion of leisure time and our longer period of training prior to adult entrance into vocations we will

soon have time and facilities whereby we may train students generally in artistic, athletic, and other motor skills as a part of their regular school experience instead of as the merely accessory "frills" which they are now too often considered.

If we have reasonable liberalization of our educational programs in the next twenty years, our present type of school curriculum may well come to be regarded as the end of the "dark ages" for motor skills. There is nothing magical required for such progress, simply the application of our best practices in teaching other subjects, together with the general principles of time-and-motion study and some experimentation in the best methods of teaching the use of tools, machines, and instruments.

REFERENCES

1. ABRAMSON, J., and LE GARREC, S. "Notes sur quelques correlations psychomotrices chez les ecoliers normaux," *Hygiene Mentale*, XXXII (1937), 1-8.
2. ALBERT, R. "Uber die Vererbung der Handgeschicklichkeit," *Archiv gesamte Psychologie*, CII (1938), 1-63.
3. ALLPORT, G. W., and VERNON, P. E. *Studies in Expressive Movement*. New York: Macmillan Co., 1933. Pp. xiii + 269.
4. BELLOW, R. M. "The Status of Selection and Counseling Techniques for Dental Students," *Journal of Consulting Psychology*, IV (1940), 10-15.
5. BRODY, D. "Twin Resemblances in Mechanical Ability, with Reference to the Effects of Practice on Performance," *Child Development*, VIII (1937), 207-16.
6. BRYAN, W. L. "On the Development of Voluntary Motor Ability," *American Journal of Psychology*, V (1892), 123-204.
7. BURR, E. T. and METCALFE, Z. "I. E. R. Assembly Test: Revised Norms based on Short Form," *Journal of Applied Psychology*, XXI (1937), 372-78.
8. BUXTON, C. E. "The Application of Multiple Factorial Methods to the Study of Motor Abilities," *Psychometrika*, III (1938), 85-95.
9. BUXTON, C. E., and HUMPHREYS, L. G. "The Effect of Practice upon Inter-correlations in Motor Skills," *Science*, LXXXI (1935), 441-42.
10. COX, J. W. *Manual Skill: Its Organization and Development*. Cambridge, England: University Press, 1934. Pp. xx + 247.
11. GARRETT, H. E., and SCHNECK, M. R. *Psychological Tests, Methods and Results*. New York: Harper & Bros., 1933. Pp. x + 137 + 235.
12. GILBERT, J. A. "Researches on the Mental and Physical Development of School Children," *Studies from the Yale Psychology Laboratory*, II (1894), 44-100.
13. GOODENOUGH, F. L. "The Development of the Reactive Process from Early Childhood to Maturity," *Journal of Experimental Psychology*, XVIII (1935), 431-50.
14. GREENE, E. B. *Measurements of Human Behavior*. New York: Odyssey Press, 1941. Pp. xxi + 777.

15. HALL, G. S. *The Psychology of Adolescence*, Vol. I. New York: D. Appleton & Co., 1905. Pp. xx + 589.
16. HAZLEHURST, J. H. "Factorial Analysis of Measures of Mechanical Aptitude," *Summaries of Doctoral Dissertations, Northwestern University*, Vol. VIII, pp. 287-93. Evanston, Illinois: Northwestern University, 1940.
17. HOLCOMB, G. W., and LASLETT, H. R. "A Prognostic Study of Engineering Aptitude," *Journal of Applied Psychology*, XVI (1932), 107-16.
18. HUMPHREYS, L. G.; BUXTON, C. E.; and TAYLOR, H. R. "Steadiness and Rifle Marksmanship," *Journal of Applied Psychology*, XX (1936), 680-88.
19. JONES, H. E. "Reaction Time and Motor Development," *American Journal of Psychology*, L (1937), 181-94.
20. JUARROS, C. "Valor práctico de las pruebas colectivas de Oseretzky para la determinación de la edad motora," *Psicotecnia*, I (1939), 40-60.
21. LEEUW-ALBERS, A. J. DE. "Enkele critische beschouwingen over de metrische skala van Oseretzky," *Nederlandsch Tijdschrift Psychologische*, VI (1938), 215-30.
22. MCGRAW, M. B. *Growth: A Study of Johnny and Jimmy*. New York: D. Appleton-Century Co., Inc., 1935. Pp. xxi + 319.
23. MCNEMAR, Q. "Twin Resemblances in Motor Skills, and the Effect of Practice Thereon," *Journal of Genetic Psychology*, XLII (1933), 70-99.
24. METCALFE, Z., and BURE, E. T. "A Practical Form of the Girls' Mechanical Assembly Test," *Journal of Applied Psychology*, XX (1936), 672-79.
25. OSERETZKY, N. I. "Eine metrische Stufenleiter zur Untersuchung der motorischen Begabung bei Kindern," *Zsch. f. Kinderforsch*, XXX (1925), 300-14.
26. PATERSON, D. G.; ELLIOTT, R. M.; ANDERSON, L. D.; TOOPS, H. A.; and HEIDBREDER, E. *Minnesota Mechanical Ability Tests*. Minneapolis: University of Minnesota Press, 1930. Pp. xxii + 586.
27. PHILIP, B. R. "Reaction-times of Children," *American Journal of Psychology*, XLVI (1934), 379-96.
28. ROBINSON, J. B., and BELLOWES, R. M. "Characteristics of Successful Dental Students," *Journal of American Association of Collegiate Registrars*, XVI (1941), 109-22.
29. SEASHORE, R. H. "The Stanford Motor Skill Unit," *University of Iowa Studies in Psychology*, No. XII. Psychological Review Monographs, Vol. XXXIX, No. 178. Princeton, New Jersey: Psychological Review Co., 1928.
30. ———. "Motor Skills in Later Youth," *Growth and Development of the Child*, Part IV, *Appraisalment of the Child*, pp. 105-20. White House Conference on Child Health and Protection, Section 1 A, 1931. New York: The Century Co., 1931.
31. ———. "Experimental and Theoretical Analyses of Fine Motor Skills," *American Journal of Psychology*, LIII (1940), 86-98.
32. SEASHORE, R. H., and ADAMS, R. D. "The Measurement of Steadiness: A New Apparatus and Results on Marksmanship," *Science*, LXXVIII (1933), 285-87.
33. SEASHORE, R. H.; BUXTON, C. E.; and MCCOLLOM, I. N. "Multiple Factorial Analyses of Fine Motor Skills," *American Journal of Psychology*, LIII (1940), 251-59.

34. SEASHORE, R. H.; STARMANN, R.; KENDALL, W. E.; and HELMICK, J. S. "Group Factors in Simple and Discriminative Reaction Times," *Journal of Experimental Psychology*, XXIX (1941), 346-49.
35. SEASHORE, S. H. "The Aptitude Hypothesis in Motor Skills," *Journal of Experimental Psychology*, XIV (1932), 555-61.
36. SPAETH, R. A., and DUNHAM, G. C. "The Correlation between Motor Control and Rifle Shooting," *American Journal of Physiology*, LVI (1921), 249-56.
37. STANTON, H. M., and KOERTH, W. *Musical Capacity Measures of Adults Repeated after Music Education*. University of Iowa Studies, Series on Aims and Progress of Research, No. 31. Iowa City, Iowa: State University of Iowa, 1930. Pp. 18.
38. STENQUIST, J. L. *Measurements of Mechanical Ability*. Teachers College Contributions to Education, No. 130. New York: Teachers College, Columbia University, 1930. Pp. ix + 101.
39. STETSON, R. H., and BOUMAN, H. D. "The Co-ordination of Simple Skilled Movements," *Archives Néerlandaises de Physiologie*, XX (1935), 177-254.
40. SURBER, P. *Reaktionen auf Schallbreize*. Zurich, Switzerland: Leeman, 1931. Pp. 49.
41. WALKER, R. Y., and ADAMS, R. D. "Motor Skills: The Validity of Serial Motor Tests for Predicting Typewriting Proficiency," *Journal of Genetic Psychology*, XI (1934), 173-86.
42. WYATT, R. F. "The Improvability of Pitch Discrimination," *Summaries of Doctoral Dissertations, Northwestern University*, Vol. IX, pp. 308-13. Evanston, Illinois: Northwestern University, 1941.

CHAPTER VIII

MENTAL DEVELOPMENT IN ADOLESCENCE

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Two decades ago the study of mental development possessed an intriguing novelty which has long since passed to psychological problems of more recent origin. The literature on this topic has, however, continued to grow, and has now become so extensive and at many points so difficult to interpret that no merely casual interest can be expected to master it. The techniques of investigation have also undergone a growth process, as new standards and requirements have emerged. The noteworthy amount of attention which this problem still receives is evidence of its importance and of its bearing upon many aspects of psychological and educational research.

I. THE VARIATION OF MENTAL ABILITY

While intelligence tests are by no means the only approach to the study of mental development, it cannot be denied that test results provide our greatest body of evidence on this subject.¹ It is obvious, however, that tests of mental ability do not offer as simple and unambiguous a picture as measurements of a physical dimension, such as stature, for whereas in the latter case we have a single and univer-

¹ Other aspects of intellectual functioning are represented in qualitative and quantitative studies of concept formation, intellectual learning, and reasoning. The omission of these topics in the present treatment is due partly to space requirements and partly also to the scarcity of studies which have described and analyzed developmental changes.

sally understood linear measurement, in the case of intelligence we have many different tests which do not always yield exactly the same information.

This becomes a matter of particular importance in the study of age changes, for the assessment of such changes will depend upon the comparability of the tests which we use at different ages. A leading factor to consider in this connection is the spread or dispersion of mental scores, which can be examined when all of the scores of a given group are plotted in a distribution curve. The *degree* of variation is not only of technical importance in evaluating different scores, but is also of immediate practical importance in view of the close relation between teaching problems and the dispersion of ability in a given class. A related problem involves the *form* of the distribution curve.

As in the case of a wide variety of biological data, it is commonly expected that mental-test scores of children chosen at random from any age group will tend to assort themselves according to the "normal curve of probability." Thorndike has presented evidence on this point from test scores of approximately fifteen thousand sixth-grade children, the scores of eleven different tests being composited. Figure 1, adapted from Thorndike (22: 527), shows this composite distribution curve, with a normal (Gaussian) curve dotted in for purposes of comparison. Also shown, for use in connection with later sections, are positions on the distribution curve corresponding to certain scales of values commonly employed in expressing test results (T-scores and percentiles). In interpreting the close fit of the actual data to the theoretical distribution, Thorndike has pointed out that the normal curve bears an excellent reputation in psychological literature, and that the results to be noted in Figure 1 may represent a deliberate and very successful effort of test constructors to adjust their units so that a normal curve will be the necessary outcome. This seemed to Thorndike the more possible, in view of the fact that "the sixth grade approximates the mean of the range of ability for which the tests have been generally devised." It was found, however, that the same or similar tests yielded similar distributions in the ninth and twelfth grades and among college students; from further study the conclusion was reached that a normal curve is due neither to the ingenuity of the testers nor to the effects of accumulated error of measurement,² but to

²This factor was examined by plotting distributions for scores of increasing reliability, based on progressive composites of from two to six tests of the same children. Essentially similar distributions, "in general accordance with the normal probability curve," were found throughout. (22: 531-33).

"the actual variation of intellect" (22: 550) in the groups in question. This demonstration of the persistence of a normal spread of intelligence scores during the period of adolescence has many practical implications in the treatment of mental test data and in administrative arrangements which take into account individual differences in mental ability.

Various special factors may, however, disturb the symmetrical normality of distributions. The normal probability curve will not be

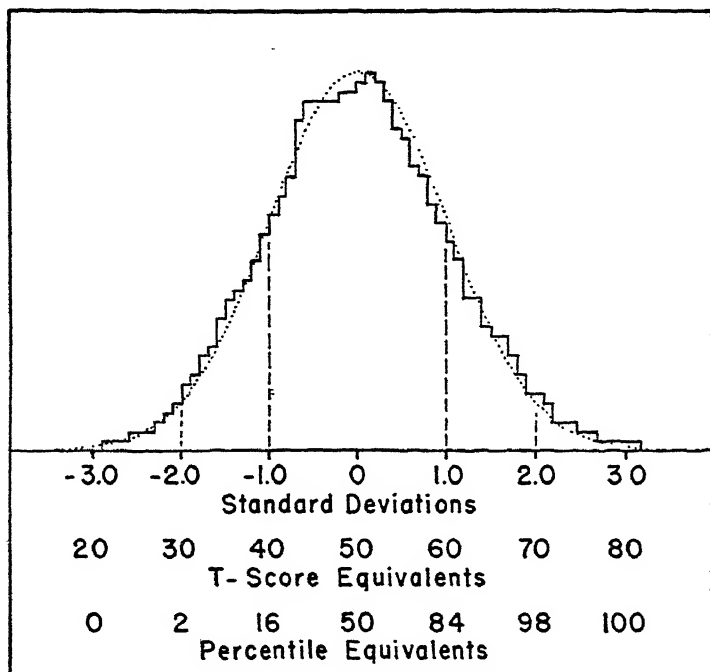


FIG. 1.—Comparison of actual distribution of test scores of sixth-grade pupils with theoretical distribution.

revealed if, for example, the tests lack "bottom" or "top"³ or if they involve gross inequality of units of measurement. A flatness of distribution or greater-than-normal dispersion may result if heterogeneous groups are combined; thus, a senior high school which brings together sharply contrasting socio-economic or racial groups may present a different picture, as to the distribution of mental abilities, than an elementary school consisting of more homogeneous neighborhood populations. One well-established and authentic exception to normality is the excess, in the total population, of very low IQ's; for example,

³ Inadequacy in measuring the lower or the upper ranges of mental ability.

Roberts *et al.* (15) estimate that the proportion of cases below IQ 45 is about fifteen times as great as would be expected in a normal distribution with the observed mean and standard deviation.⁴ For any given age of *school children*, however, it seems safe to say that good tests of typical samples yield fairly symmetrical and normal distributions of intelligence throughout adolescence.

II. THE GROWTH CURVE FOR GENERAL INTELLIGENCE

During the past quarter century numerous attempts have been made to describe the mental-growth curve in adolescence. Not all psychologists are agreed as to the feasibility of doing this in a precise way (13). Nevertheless, something of value can be learned from the study of age changes in any reasonably valid mental test applied to an adequate sample of cases. We shall speak of these age changes as "mental growth," recognizing that we are dealing not with the growth process itself but with the products of growth as shown by records of mental status at successive ages. We must also recognize that in some respects our measurements are less definitive and less valid than those which are available for the study of physical growth.

Results from two early approaches to this problem are shown in Table I. The first report, by Lufkin (11), gives the average mental test scores of a rural school population for six ages between twelve

TABLE I.—AVERAGE ALPHA SCORES BY AGE

Age in Years	Data from Lufkin (11)	Data from Teagarden (18)
12.5.....	56	55
13.5.....	81	66
14.5.....	86	81
15.5.....	95	93
16.5.....	99	108
17.5.....	104	107

and a half and seventeen and a half years. The second report, by Teagarden (18), gives age medians for the juvenile population of Mooseheart, an institution for normal children maintained by a fraternal order. Both investigators used the Army Alpha, a pioneer group-test similar in form and content to many more recently standardized intelligence examinations. The two sets of data in Table I show a fair agreement as to mental score changes during adolescence

* One reason for this may be the effect of secondary factors (illness and other pathology) which interfere with the normal distribution by displacing some IQ's downward.

and suggest that gains in score are probably greater in the earlier than in the later teens.

In connection with any growth curve for intelligence, the question arises whether intelligence at one age is actually comparable with intelligence at another. Are we entitled, for example, to assume that our mental scores of twelve-year-old children are similar in kind and meaning to the mental scores of youths near the end of adolescence? It should be pointed out that this problem is not peculiar to psychological data; in the field of physical growth, for example, it is well known that the variable "height" has at different ages a different composition as to proportions of trunk and legs (see p. 42); biologically, height is by no means a simple variable, but this complicating fact has not served to eliminate either the scientific or the popular interest in height records. The composition of mental scores, more complex and less easily ascertained than is the case with physical measures, is no less certainly subject to change as children grow older. Unquestionably, the contribution of different mental factors to total mental scores will vary from age to age and individual to individual—and also (since we have no "pure" measure of "general" intelligence) from test to test. In spite of the ambiguities thus introduced, most investigators consider that the concept of general intelligence has been of sufficient value to justify the attempt to draw a growth curve based on composite mental scores.⁵

This attempt to portray age changes in intelligence encounters at least one further difficulty if we employ raw score averages such as those in Table I. What assurance can we have that the characteristics of the curve obtained for a given test are really characteristics of mental development and not merely an artifact of the particular scoring system used? Different tests are almost certain to yield different growth curves, depending on differences in the number, nature, and difficulty of items and on procedures for administering and scoring. If such curves are to be evaluated for common factors, some means must be found to make the data comparable, and to eliminate the influence of the purely arbitrary factors specific to any given test procedure. One common way of reducing the idiosyncrasies of raw scores is to transform them into "scaled" measures based on the standard deviation of some appropriate age group. When this is done, growth curves for various tests can be constructed with greater confidence that they can be compared. We can also feel some confidence that the units of

⁵ The chapter to follow will deal with the problem of mental growth in more specific functions.

the scaled measures will have a greater degree of equality, for different parts of the scale, than was true of the original measures. Thus, in the data reported by Lufkin and shown in Table I, we may note that the score change from twelve and a half to thirteen and a half years is twenty-five points, and the score change from sixteen and a half to seventeen and a half is only five points. The former change is five times as great as the latter only if the units are equal; the chances are, however, that the units are actually unequal in difficulty-value at different points in the score range. Scaling may not completely rectify such irregularities, but it can be expected to improve the interpretability of the results.

Figure 2 presents two smoothed growth curves, from data published by Jones and Conrad (7) and Wechsler (27), in which raw scores have been transformed into a kind of "T-score" based on the distribution of mental abilities of adults (in the same populations) between the ages of twenty-five and forty years.⁶

Smoothed, they present somewhat similar curves of parabolic form; the chief differences between the curves occur at ages twelve and a half and thirteen and a half; this may be influenced by fluctuations in sampling, and may also indicate some genuine tendency in the Jones-Conrad sample for a period of slower growth to precede the large increment found between twelve and fourteen years. The degree of similarity of these curves becomes more significant when it is noted that they are derived from studies widely different as to sampling and as to specific test methods and content. Almost the only point in common in these investigations was that they were both concerned with portraying age changes in "general" intelligence.⁷

⁶By this method, one unit at any point in the scale or at any age becomes equivalent to 1/10 of 1 S.D. of the distribution of adults; a T-score of 40 is 1 S.D. below the average adult score, and a T-score of 50 equals the adult average. Jones and Conrad (7: 290) present T-score equivalents in their monograph and demonstrate that they meet Thorndike's criterion of equal units; these T-score equivalents have been used in preparing one of the curves in Figure 2. For the other curve, Wechsler (27: 120) reports average standard scores for each age group; the present writers have used the average mean and average S.D. for his age groups 25-40 in computing T-score averages at the adolescent ages. (The relation of T-scores to positions within a normal distribution is shown in Fig. 1.)

⁷The Jones-Conrad study, based on the Army Alpha group test, included 644 cases between the ages of ten and twenty-five; the sampling was remote-rural, with an average IQ of approximately 90. The Wechsler study, based on the Wechsler-Bellevue individual intelligence scale, included 780 cases between the same ages; these were almost entirely from New York City, constituting a fairly representative urban white selection.

In chapter vi growth curves have been presented for physical abilities, not merely in terms of physical units (such as kilograms of pressure on a dynamometer) but also in terms of *percentage* of adult performance or of performance at a terminal age. Can similar percentage curves be constructed for mental abilities, which will enable us to assess the relative maturity attained at any given age? It would be meaningless to attempt to do this with the data of Figure 2, for per-

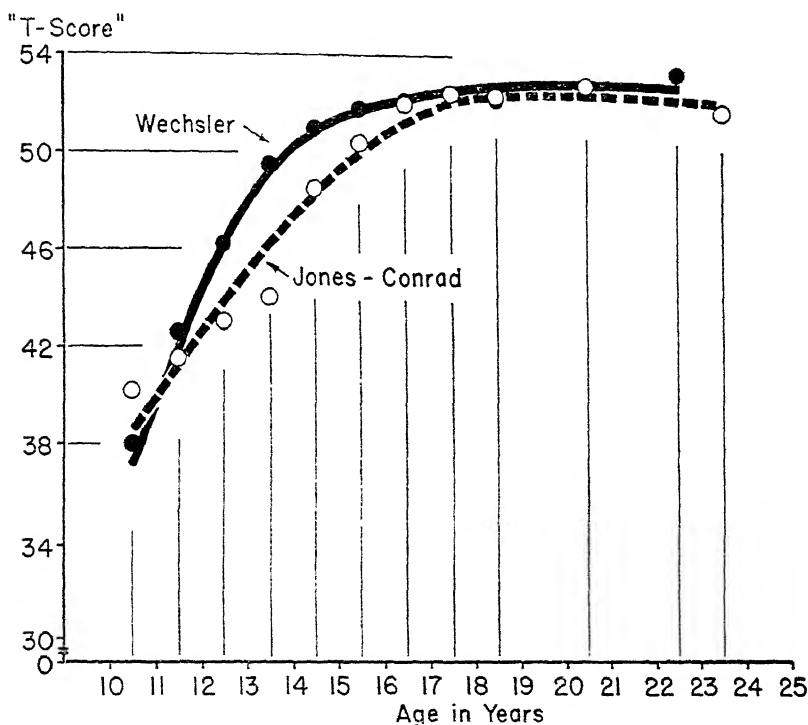


FIG. 2.—Mental growth curves in terms of T-scores.

centages imply a numerical scale for which the zero point is known. The scaling of intelligence scores with reference to an "absolute zero" is unnecessary for most practical purposes (as in a guidance program or in classifying pupils); but if we wish to treat such scores mathematically in the same way that we have long been accustomed to treat measures of length or weight or pressure, we should know the zero point of our scale. One suggested method of determining this is to extend an equal-unit growth curve backwards until it intersects the baseline, thus locating its origin; this is a risky procedure, however, for we cannot be sure that our extrapolation has accurately taken account of changes in rate of growth in the early part of the curve. Thurstone

(25) has attempted to solve this problem in another way.⁸ When raw scores are transformed into *absolute* scores scaled by Thurstone's method, it is theoretically possible to transform them further into percentages of adult performance. This has been done by the writers for the data of two studies, by Thurstone and Ackerson (26) and by

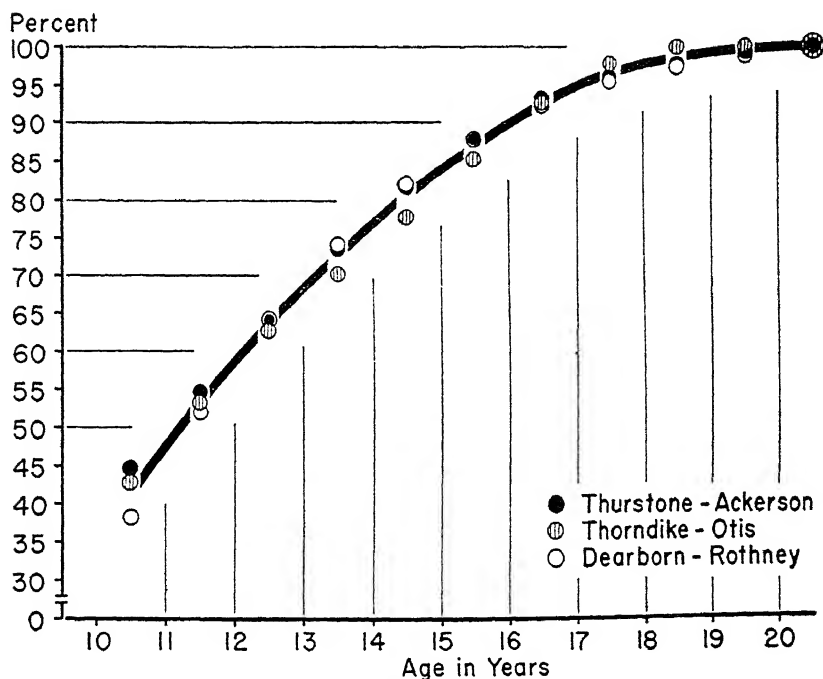


FIG. 3.—Mental growth curves in percentage of mature status.

Dearborn and Rothney (2). The results are shown in Figure 3, together with an additional series of percentage points based on Thorndike's (22) absolute scaling of the norms for the Otis Advanced Examination.⁹ The three studies in question involve, respectively, a

⁸ Thurstone assumes that the absolute variability of mental scores is directly proportional to the absolute mean mental performance. When average mental scores diminish to zero, their variability is also zero. While we cannot measure mental ability near its vanishing point, we can infer its scale position by plotting the S.D. of absolute mental scores against the mean mental score at each age for which reliable measures are available; this will result in a straight line which can be extrapolated backwards to the point at which the S.D. becomes zero, and which is also the point of zero mental performance.

⁹ In each study the absolute score at age 20.5 (as extrapolated by the original authors) was taken as the adult performance level.

clinic sample from Illinois, tested by the 1916 Stanford-Binet (average IQ approximately 80); a sample of Massachusetts children tested longitudinally with a variety of group tests; and a school sample, providing a cross-section of successive ages, used in standardizing a group mental scale. In Figure 3 the points for the three studies lie so close together that it is not possible to show three curves; the curve that is drawn represents, rather, an average of the three. In this figure, then, we have another instance of wide differences in sampling and test methods with nevertheless fairly similar results when analyzed in terms of fundamental growth curves.

It may be noted that in this series of determinations the level of 50 per cent of adult status is reached shortly after eleven years; the remaining half of mental growth occurs during adolescence and the early part of postadolescence.¹⁰ Some of the educational implications of the curve of mental growth will be discussed in the chapter to follow, in connection with problems arising from the study of growth differences.

III. THE LIMIT OF GROWTH OF GENERAL INTELLIGENCE

If the growth of intelligence were to stop sharply and suddenly, somewhere near the end of adolescence, the upper age-limit of average development could be easily fixed. Actually, the gradualness of the "leveling off" makes a precise determination of the upper limit very difficult. At one time our principal source of evidence on this problem was from cross-sectional records based on school populations; while such data are of practical value for normative use in schools, they are subject to the criticism of selective sampling at the older ages. In recent years, however, "school mortality" has tended definitely to decrease. Norms from the more recently and more extensively standardized group-tests should therefore contribute useful informa-

¹⁰ Thorndike's (22) study of mental growth based on the CAVD test, led him to the inference that a much smaller proportion of mental development occurs during adolescence. In fact, by his method of absolute scaling approximately 95 per cent of mature ability (in terms of "altitude" of intelligence) is assumed to be acquired by the age of ten and a half years. Thorndike has inferred that the early part of the mental growth curve is characterized by rapid negative acceleration, while Thurstone finds evidence of an early period of positive acceleration, with an inflection point at about eleven years. The CAVD curve is similar to the growth curve of neural tissues, but is unlike that of other mental tests, including the Otis test which has been scaled by Thorndike by the same method employed in scaling the CAVD.

tion concerning growth limits especially if, as in the case of the Terman-McNemar *Test of Mental Ability* (19), the authors make an attempt to correct for such selection as is known still to exist within school systems. The age-norms for the Terman-McNemar test are given in Table II. It is clear, according to this table, that growth has not ceased at nineteen, although annual gains tend to diminish.

A more direct approach to the control of selection at the upper ages is through the use of a sample independent of school enrolment. This method has been used in studies already referred to, by Tea-

TABLE II.—AGE-NORMS FOR THE TERMAN-McNEMAR
TESTS OF MENTAL ABILITY

Age in Years	Standard Score	Increment Over Preceding Year
10.....	77	
11.....	84	7
12.....	90	6
13.....	95	5
14.....	100	5
15.....	105	5
16.....	109	4
17.....	113	4
18.....	117	4
19.....	120	3

garden (18) in testing an institutional group, and by Jones and Conrad (7) in a series of rural community surveys. Their results (see Table I and Figure 2) indicate that in relatively homogeneous populations mental test gains can be expected at least to the age of eighteen and probably somewhat beyond that age.

A still more direct approach is through the retesting of the same individuals after a suitable interval. In this procedure, dealing with a constant group, we avoid all concern as to shifts in sampling at the upper ages, but we encounter another problem involving the possible role of practice effects. An early study by Thorndike (21) making use of the retest procedure, concluded that, with due allowance for practice, intelligence gains continue at least to the age of nineteen years. This conclusion is supported by the recent study of Freeman and Flory (3), who have analyzed repeated retests for a sample of over four hundred children in the Laboratory Schools at the University of Chicago; some of these were tested as early as nine years of age

and were followed into college. Figure 4 compares the mental growth¹¹ of two groups of these children selected (at ages twelve, thirteen, and fourteen) as representing approximately the highest and the lowest 10 per cent of the total sample. Age curves for these two groups are compared with the average for the group as a whole; the standard deviation of the total group is also indicated by vertical columns above

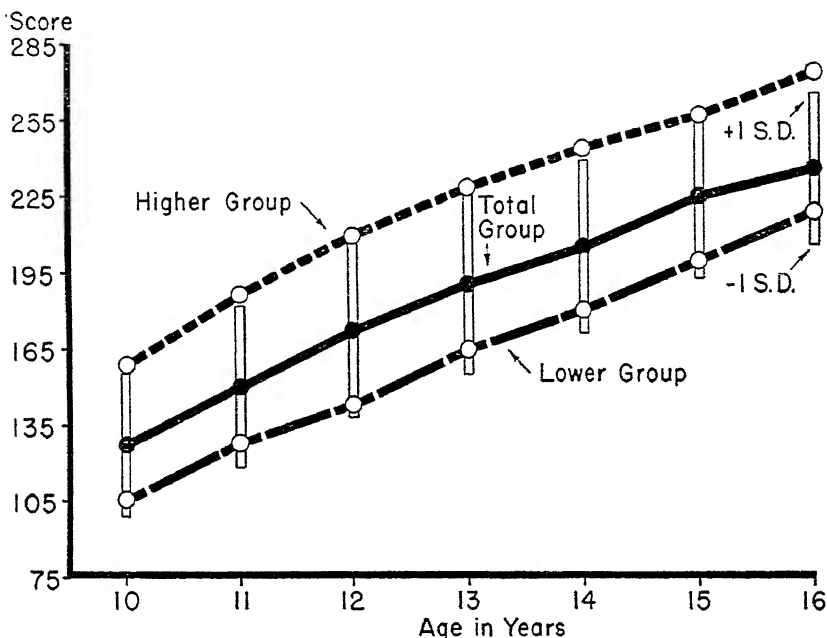


FIG. 4.—Mental growth of "bright" and "dull" groups.

and below each age mean. It can be seen that each group shows continued substantial gains at age sixteen, with little indication of approaching a plateau. The higher group retains its superiority at each age, remaining at least 1 S.D. above the group mean. It can also be noted that the lower group continues to show linear gains at an age when the total sample has an apparent tendency toward a decreased rate. Freeman and Flory comment on this finding with the following statement:

If bright children have the longest period of development it would be reasonable to assume that bright children should have an extended period of schooling, whereas the duller and more slowly developing children should be guided into a course which has an earlier termination. Our study seems to

¹¹ Point scores in the VACO tests were found to meet Thorndike's equal-unit criterion sufficiently well to justify using the raw scores in depicting age changes.

indicate that the slowly developing child can profit proportionally as much, if not more, than the bright child by a prolongation of the period of schooling (3: 69).

By distinguishing between "brightness" and "precocity" and between "dullness" and "retardation," these writers imply that some adolescents of below-average mentality are merely temporarily low because of slow development and that in due course they may be expected to reach an average adult level. They do not, however, suggest that such inferences are applicable to the feeble-minded or the borderline areas of intelligence; the Chicago study dealt with a somewhat superior sample in which the average IQ was about 115; the "lower" group was for the most part between 90 and 100 IQ.

Retests of college students have provided some impressive and interesting results. Most studies report definite gains during the college years. In two recent studies (both making use of the Psychological Examination of the American Council on Education) the gains from Freshman to Senior year have been especially large, amounting to as much as a full standard deviation of the distribution of Freshman scores (McConnell, 12; Livesay, 10). Livesay's sample ranged in age from fifteen and a half to twenty-seven and a half; and he reports that *every single individual* gained in total score. Such large and consistently positive gains at these ages would seem to go considerably beyond the scope of purely biological growth in basic intelligence; they suggest (as one contributing factor) some rather direct influence of the educational environment.¹²

In view of these findings with group tests, it is surprising that with careful sampling methods Terman and Merrill (20) have found that by the age of sixteen yearly gains have become "approximately zero,"

¹² This is further suggested in the analysis of differential gains on individual subtests. In a study of repeated records of Bryn Mawr students on the Thorndike Intelligence Examination, Rogers reported that the most marked improvement was in tests heavily weighted with reading ability; he inferred that the explanation probably lies in the fact that "this is the one ability most constantly exercised by college students" (16: 698). Hartson (4) has provided a more detailed analysis in terms of the relative gains achieved by students in different curriculums; on the Ohio State University Psychological Examination he reported that language majors tend to show their greatest gains in verbal subtests, together with losses in mathematical tests, while mathematics majors show their greatest gains on subtests involving work with numbers. Any common-sense interpretation of this would certainly emphasize the role of educational factors, although in the absence of strict experimental evidence we cannot exclude the possibility that differential gains may reflect, to some extent, different growth patterns in specific aptitudes.

in the case of our best-known individual test, the revised Stanford-Binet. It can be noted in Figure 3 that three investigations (one of them with the 1916 Stanford-Binet) indicate that the average ability level at fifteen and a half years is not more than 85 per cent of the mature intelligence level. In his recent revision of the Kuhlmann-Binet test, Kuhlmann finds: "Age median scores increase up to eighteen, apparently indicating that development continues well beyond this point. We do not know how much the continued increase in median raw scores . . . is due to an increasing elimination from the schools of the duller subjects in the age groups used for getting norms. We believe, however, we are fully justified in placing it as high as age sixteen, and are tempted to place it even higher" (9: 97). On the Wechsler-Bellevue Scale it is also evident (see Figure 2) that scores improve at least until age seventeen.

In offering a conclusion for this section, it may be said that the bulk of evidence on "general intelligence" indicates a limit of growth not earlier than eighteen to twenty years. Such inconsistencies as appear may be due to varying selection at the upper ages, and also to inadequacies of some intelligence scales in measuring the upper levels of ability. It is difficult to reconcile the Terman-Merrill results with other reports, for in this case there seems little doubt that the test is valid at the upper ages. A study of McNemar's percentage tables, however, shows that a considerable proportion of the Stanford-Binet items are in fact characterized by an increase in percentage passing at ages seventeen and eighteen (13). McNemar seems inclined to minimize this as representing some effect of selection, although it is apparent that great care was used in the standardization in order to obtain a comparable selection at successive ages. Perhaps we may conclude that the "fifteen-year age limit" used in computing the Revised Stanford-Binet IQ's is a convenience in test procedure rather than a true reflection of the growth limit of mental ability.

IV. THE CONSISTENCY OF MENTAL GROWTH IN ADOLESCENCE

Studies of younger children have indicated that in general very little relationship exists between scores on mental tests prior to the age of two years and scores obtained in later childhood (3). The stability of scores increases during the preschool period, so that retests at intervals of one or two years give the impression that on the average IQ's are sufficiently constant to justify short-range prediction.¹³

¹³ For reviews concerning the constancy of the IQ, see Nemzek (14), and R. L. Thorndike (23, 24).

Over longer periods, however, the prediction becomes less satisfactory. From the data of the Harvard Growth Study, Anderson (1) reports correlations only slightly above .50 between mental scores at seven and sixteen years. Some of the discrepancies in individual growth curves, implied by this order of relationship, can be visualized in Figure 5 based on Dearborn and Rothney's (2: 329) analysis of the same data. In this figure mental age curves are drawn for five boys whose

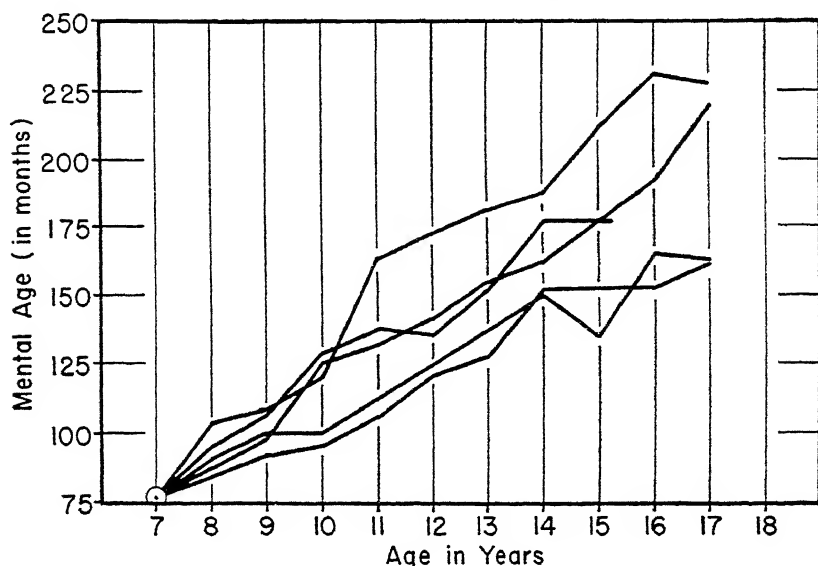


FIG. 5.—Diverging individual mental growth curves.

scores were identical at the age of seven years; at this time the IQ of each boy was 92. The cases were selected at random from a sample having the specified initial status. The progressive divergence in these curves, with terminal IQ's ranging from below 80 to above 110, suggests the importance of repeated measurement if accurate classifications are to be maintained. It is possible that some of this apparent variability is due to the fact that different tests were used, and that these were group tests which, at the lower ages are probably less reliable than an individual test. Figure 6 presents another series of individual growth curves, beginning at an average age of eleven years. These curves, from the data of the California study (6), are based on standard or T-scores in which 50 is the average for the school grade, and 10 is the standard deviation of that grade. By this method, an individual who maintains his position relative to a constant group of classmates will have a growth curve which is consistently horizontal,

or parallel to the mean at 50; a rising curve indicates a rate of growth which is greater than the average; a falling curve indicates slower growth than the average.¹⁴

Cases 1 and 7 in the figure represent, respectively, the highest and the lowest scores in the initial test, out of a group of approximately one hundred girls. Case 4 represents an average score of 50 on this initial test, and the other cases were spaced, (as equally as the distribution permitted) at points 1 S.D. apart. Where more than one name was found at a given point, the one first in the alphabet was taken. Thus, Figure 6 represents a random selection of individual growth

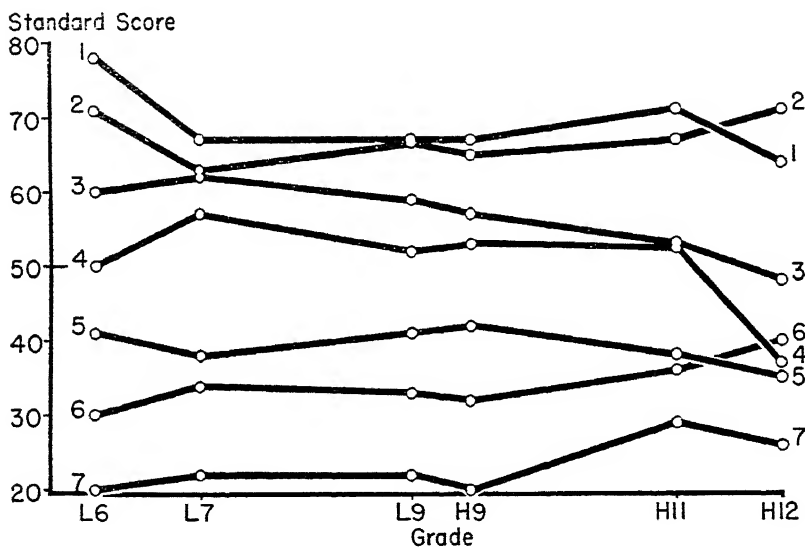


FIG. 6.—Individual mental growth curves in standard scores (girls).

curves, restricted only by the arbitrary requirements of spacing on the initial measurement.¹⁵

In examining these curves, we note that Cases 1 and 2 show a regression toward the mean from the first to the second test, and thereafter maintain a fairly even course from 1.5 to 2 S.D. above the group mean; although the standard score curves give the impression of con-

¹⁴ The first test in this series was the CAVD, scored in terms of total points achieved in a two-hour test. The next two tests represent the average of two forms of the Terman Group Test. The fourth and fifth measurements were based on single forms of the Terman Group Test, and the final record (Grade XII) was based on the Revised Stanford-Binet.

¹⁵ The initial position of each case, with reference to a normal distribution curve, can be seen by referring to the designated T-score equivalents in Fig. 1.

siderable fluctuation, these two cases remain at all times within the top 10 per cent of the total sample. Case 3 presents an interesting example of a systematic downward trend from a position 1 S.D. above the average to a point slightly below the average; relative to a constant group of classmates, this change in mental status from the seventh to the twelfth grade is of considerable importance, representing as it does a gradual and steady decline from the eighty-eighth to the forty-second percentile of the grade group. Physiologically, this was a case of early maturing, together with an apparent tendency toward an increased rate of mental growth in later adolescence; these two cases appear to illustrate, for individuals, the general findings cited in the next chapter (section iii) concerning the relationship of sexual maturing and mental development. It should not be expected, however, that such a relationship will hold for all cases.

The remaining curves of Figure 6 (Cases 4, 5 and 7) present a fairly even course of growth. The sharp drop shown by Case 4 in the final test (Stanford-Binet) seems to be out of line with the results on group tests, although a similar score was obtained on an earlier Stanford-Binet given in the seventh grade; this illustration of differences among tests should be borne in mind in interpreting growth curves which are based on a variety of test instruments. Even on the same tests, however, year-to-year changes can be noted, as in the second, third, fourth, and fifth measurements (Terman Group test) for the curves in Figure 6. This has also been shown by Freeman and Flory, who present individual curves from the VACO test representing various types of growth during adolescence: linear, negatively accelerated, and positively accelerated. (3: 60-62).

It will thus be seen that the smooth and relatively uniform course of mental growth, as revealed when average values are plotted for successive ages (see Figures 2 and 3) may fail to do justice to the complex variety of growth curves shown by individuals. It is not within the scope of this chapter to interpret these idiosyncrasies in growth with reference to the range of factors which may be responsible for them.¹⁶ The fact, however, that these age changes exist, and that individual variation is important through time as well as within cross-sectional measurements, indicates again the necessity of basing guidance and classification upon cumulative records (8). In his mental abilities as well as in other areas of development, an individual's position at any given time must be seen in the light of his earlier history.

¹⁶ For recent discussions of environmental influences upon intelligence, see references (5, 17).

REFERENCES

1. ANDERSON, J. E. "The Prediction of Terminal Intelligence from Infant and Preschool Tests," *Intelligence: Its Nature and Nurture*, pp. 385-403. Thirty-ninth Yearbook, of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education (5835 Kimbark Avenue), 1940.
2. DEARBORN, W. F.; ROTHNEY, J. W. M.; and OTHERS. *Predicting the Child's Development*. Cambridge, Massachusetts: Sci-Art Publishers, 1941. Pp. 360.
3. FREEMAN, F. N., and FLORY, C. D. *Growth in Intellectual Ability as Measured by Repeated Tests*. Monographs of the Society for Research in Child Development, Vol. II, No. 2. Washington: National Research Council, 1937. Pp. xi + 116.
4. HAERTSON, L. D. "Does College Training Influence Test Intelligence?" *Journal of Educational Psychology*, XXVII (1936), 481-91.
5. JONES, H. E. "Environmental Influences upon Mental Development," *A Manual of Child Psychology*. (L. Carmichael, ed.). New York: John Wiley & Sons, Inc. (in press).
6. ———. Unpublished mss., Institute of Child Welfare, University of California, Berkeley.
7. JONES, H. E., and CONRAD, H. S. "The Growth and Decline of Intelligence: A Study of a Homogeneous Group between the Ages of Ten and Sixty." *Genetic Psychology Monographs*, XIII (1933), 223-298.
8. KEYS, N. *The Improvement of Measurement through Cumulative Testing: An Empirical Study of Two Hundred Elementary-School Children over a Period of Four Years*. Teachers College Contributions to Education, No. 321. New York: Teachers College, Columbia University, 1928. Pp. viii + 81.
9. KUHLMANN, F. *Tests of Mental Development*. Philadelphia: Educational Test Bureau, 1939. Pp. xi + 314.
10. LIVESAY, T. M. "Does Test Intelligence Increase at the College Level?" *Journal of Educational Psychology*, XXX (1939), 63-68.
11. LUFKIN, H. M. "Report of the Use of Army Alpha Test in Rural Schools," *School and Society*, XIII (1921), 27-30.
12. McCONNELL, T. R. "Change in Scores on the Psychological Examination of the American Council on Education from Freshman to Senior Year," *Journal of Educational Psychology*, XXV (1934), 66-69.
13. McNEMAR, Q. *The Revision of the Stanford-Binet Scale*. Boston: Houghton Mifflin, 1942. Pp. 189.
14. NEMZEK, C. L. "The Constancy of the IQ," *Psychological Bulletin*, XXX (1933), 143-68.
15. ROBERTS, J. A. F.; NORMAN, R. M.; and GRIFFITHS, R. "Studies on a Child Population: IV. The Form of the Lower End of the Frequency Distribution of Stanford-Binet Intelligence Quotients and the Fall of Low Intelligence Quotients with Advancing Age," *Annals of Eugenics*, VIII (1938), 319-36.
16. ROGERS, A. L. "The Growth of Intelligence at the College Level," *School and Society*, XXXI (1930), 693-99.

17. STODDARD, G. D. *The Meaning of Intelligence*. New York: Macmillan Co., 1943. Pp. ix + 504.
18. TEAGARDEN, F. M. *A Study of the Upper Limits of the Development of Intelligence*. Teachers College Contributions to Education, No. 156. New York: Teachers College, Columbia University, 1924. Pp. vi + 112.
19. TERMAN, L. M., and McNEMAR, Q. *Terman-McNemar Test of Mental Ability. Manual of Directions*. Yonkers-on-Hudson, New York: World Book Co., 1941. Pp. 12.
20. TERMAN, L. M., and MERRILL, M. A. *Measuring Intelligence: A Guide to the Administration of the New Revised Stanford-Binet Tests of Intelligence*. Boston: Houghton Mifflin Co., 1937. Pp. 461.
21. THORNDIKE, E. L. "On the Improvement of Intelligence Scores from Thirteen to Nineteen," *Journal of Educational Psychology*, XVII (1926), 73-76.
22. THORNDIKE, E. L. and OTHERS. *The Measurement of Intelligence*. New York: Bureau of Publications, Teachers College, Columbia University, 1927. Pp. 616.
23. THORNDIKE, R. L. "The Effect of the Interval between Test and Retest on the Constancy of the IQ," *Journal of Educational Psychology*, XXIV (1933), 543-49.
24. ———. "Constancy of the IQ," *Psychological Bulletin*, XXXVII (1940), 167-86.
25. THURSTONE, L. L. "A Method of Scaling Psychological and Educational Tests," *Journal of Educational Psychology*, XVI (1925), 433-51.
26. THURSTONE, L. L., and ACKERSON, L. "The Mental Growth Curve for the Binet Tests," *Journal of Educational Psychology*, XX (1929), 569-83.
27. WECHSLER, D. *The Measurement of Adult Intelligence*. Baltimore, Maryland: Williams & Wilkins, 1939. Pp. ix + 229.

CHAPTER IX

DIFFERENTIAL MENTAL GROWTH

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I. GROWTH DIFFERENCES OF BRIGHT AND DULL

Of considerable social and educational importance is the problem of the relationship of growth to intelligence level. The preceding chapter has furnished examples of individual mental growth within various zones of the distribution curve (Figure 6, p. 160). For our present purpose, however, we wish to know whether, in general, a different course of growth is characteristic for children of higher and of lower intelligence. We may consider three possibilities: first, that individuals at various levels of ability advance at about the same rate, maintaining parallel growth curves; second, that the combined process of growth and education tend to produce more homogeneous groups, with converging growth curves; and, third, that during a given interval individuals advance at a rate more or less proportional to their initial ability. The latter condition would, of course, involve a tendency for growth curves to diverge, and for the bright and dull to become less similar with increasing age: it would also imply that the task of edu-

cation, in adapting classroom methods to the abilities of pupils, becomes more difficult as pupils grow older and more heterogeneous.

Several studies have attacked this problem by utilizing retest correlations to determine the relation between initial score and gain during a specified interval. The best known of these investigations¹ agree in finding no significant degree of relationship. Unfortunately, these investigators appear to have overlooked the influence of errors of measurement upon the correlation between initial scores and gains. Suppose that, by chance error, a child's initial score is *too low*, but that his second score is quite exactly correct; such a child's recorded gain would be *too high*, due to the error in the initial test. It can quite simply be shown, algebraically, that "the error of the initial score is present in the gain-score with the same magnitude but with opposite sign" (54: 391).² It follows that the empirical correlations between initial scores and gains is always lower than the true correlation. Since the correlation for chance errors is likely to be quite substantial, it seems probable that the approximately zero correlations reported by Roff (35) and others denote in fact a positive relationship.

Another provisional approach to this problem is through the study of changes in variability. If the bright and dull become more similar with increasing age, we would, on the whole, expect that distributions of mental scores would show a diminishing spread or dispersion of scores. If the bright and dull on the other hand tend to become more unlike, with diverging growth curves, this would naturally be reflected in an increasing dispersion of scores. With some exceptions,³ the bulk of recent studies concur in demonstrating that standard deviations do in fact increase with age (26, 30, 33, 48, 49).

Among individual cases of the bright or dull, various factors will,

¹ Roff (35); Cattell (7); Roberts and Griffiths (34).

² Both Thorndike (45) and Thomson (42) pointed out this fact in 1924. Thomson (43) and Zieve (54) have published convenient formulas to eliminate the influence of errors of measurement upon correlations between initial scores and gains.

³ The most important exception, involving seriatim data from the same test, is in the study by Freeman and Flory (11), who found that standard deviations increased to about the age of 13, and decreased thereafter. (See chapter viii, Figure 4.) Apparently this was not due to any inadequacy in the test used, but it may have been an outcome of the somewhat narrow selection involved in their sampling, based on children in a private school. It may be noted that the decrease in standard deviations is due chiefly to the Analogies and Opposites tests, and does not occur at all in the case of Vocabulary.

of course, tend to modify the course of growth, with such varied results as have been shown in Figure 6 of the preceding chapter. It should also be noted that children whose initial tests are low as a result of environmental handicaps may show exceptionally large gains during a retest interval if the handicapping factor is removed or decreased within this interval. Children whose initial tests are high may show only small gains if the tests are lacking in "top." Moreover, in view of recent studies, particularly those of Bayley (3) on children during the first decade, it now seems probable that individual differences occur in growth patterns, such that within a given period some children may be developing rapidly in mental abilities, and others more slowly, as an expression of inherent characteristics of the individual. This also seems to be implied in some of the individual growth curves presented in the Chicago (11) and Harvard (10) studies. Within selected groups, as in the superior sample studied by Freeman and Flory (11), the distribution of factors may be such that growth curves at different intelligence levels are approximately parallel (see Figure 4, chapter viii) or may even show some tendency toward convergence. But over the whole range of mental ability our evidence points to the conclusion that the bright tend to "grow away from" the dull.

In drawing inferences from this tentative conclusion we should note, first, that the data presented bear on the rate of growth of persons of different levels of ability, and not on the age at which such growth terminates. So far as our evidence goes, the age of termination at the different levels does not differ. It is commonly assumed that duller individuals are subject to mental arrest in relation to normal or superior individuals. This may be true of the feeble-minded, but we have no evidence that it is true within the normal range.

It has been customary to discontinue the schooling of persons of the lower degrees of intelligence sooner than of the abler, doubtless because they cannot profit by the more advanced forms of training. This may be sound policy so far as full-time schooling is concerned. However, the very fact that these duller individuals advance more slowly might be taken to imply that their education should be continued longer in order to realize their potentialities to the fullest extent possible. The decision would have to take account of the value of such development to the individual himself and to society. As suggested on page 156, it seems likely that a continuance of education, for the lower as well as the upper levels, would be profitable, though it might well take the form of part-time or adult education.

II. SEX DIFFERENCES AND THE EFFECT OF SEXUAL
MATURING

It has been shown in chapter ii that due to earlier maturing, girls enter a phase, at around eleven years, in which they become taller and heavier than boys. At about fourteen years, however, they are overtaken by boys, who are now growing rapidly while the average growth rate of girls is sharply diminishing. Can a similar pattern of relationship be demonstrated in the case of mental growth?

In a critical review of mental sex differences, in an earlier yearbook of this Society, Kuznets and McNemar (24) have shown that studies in this field present conflicting findings both as to the degree and the direction of sex differences. Since, in any event, the differences are usually slight, one is inclined to attribute them to chance factors of selection. The factor of test composition, however, may also be important. In a homogeneous rural sample, Conrad, Jones, and Hsaio found that a general slight superiority of females was greater during adolescence. It was noted:

The sex difference is by no means uniform among the individual subtests of the Alpha. In four strongly verbal tests ("common sense," opposites, disarranged sentences, and analogies) the males are rather consistently inferior; in two tests (numerical completions and general information) the sex differences are relatively slight, with frequent intersections of the developmental curves; in one test (arithmetic problems) the males are quite definitely superior.

These results confirm conclusions reached by an item analysis of other tests administered in the same sample. It is clear, then, that the direction and extent of sex differences in a composite mental test is dependent upon the composition of the test and the weighting of its parts. Further investigation of "intelligence" differences between the two sexes should be made in terms of specific functions or items, rather than in terms of unanalyzed total scores. (8: p. 168-69).⁴

We have become so accustomed to the report of negligible sex differences in general intelligence that a test showing one sex markedly superior to the other would be regarded as of doubtful validity. The possibility remains, however, that for a short period in early adoles-

⁴ Although this has not been found true in all studies, the general tendency seems to be for girls to run higher on tests stressing perceptual discrimination and language ability, and lower on performance tests, on tests involving mathematical operations, and on tests dealing with knowledge of history, geography, and current events. For a general discussion of sex differences in mental abilities, see Stoddard (39, chap. x).

cence girls may show a generalized acceleration in mental growth greater than that exhibited by boys. One approach to the study of this problem is through the comparison of the mental status of girls who are of the same chronological age but at different points in physiological maturing. An impressive array of evidence, assembled during the past decade, indicates that earlier maturity is in fact associated with higher mental scores.⁵ Stone and Barker (40) compared 175 premenstrual girls matched by age against an equal number who had passed the menarche; on the Otis group-intelligence test, small but significant differences were obtained in favor of the physiologically more mature group. This is supported by Abernethy (1) who obtained the contrasting growth curves, for three maturity groups, shown in Figure 1. Similar results were found by Jones (20), in a comparison of approximately twenty early-maturing and thirty later-maturing

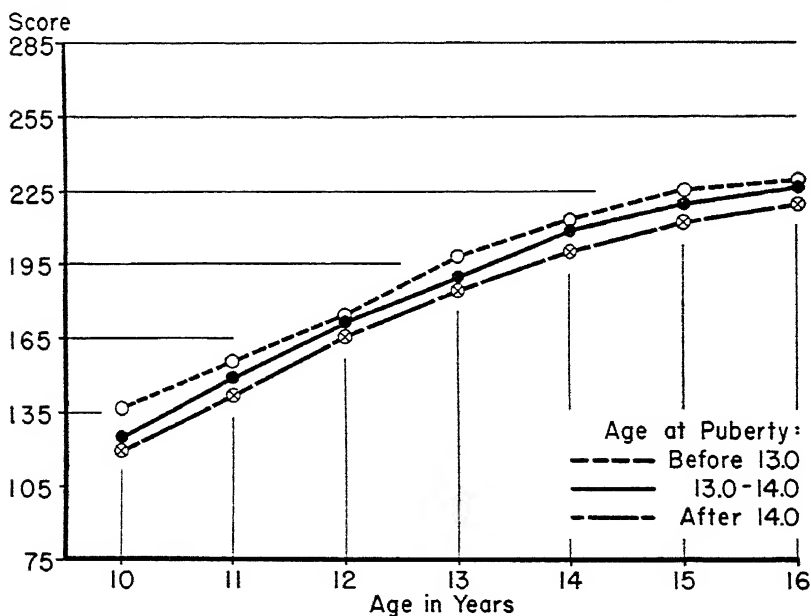


FIG. 1.—Mental growth of girls in three maturity groups.

girls; in Grade VII, 75 per cent of the early group surpassed in intelligence the mean of the later-maturing group. This superiority decreased until, in Grade XI, no differences remained between the group averages. In the case of boys, such evidence as we have concerning intelligence

⁵ This tendency is reversed at the pathological extreme. The condition known as *pubertas precox* is commonly, although not always, marked by mental retardation (23, 41).

in relation to pubescence suggests that the early maturers are, on the average, slightly higher in mental scores, up to the later years of adolescence.⁶

It is difficult to avoid the conclusion that, at least for a part of adolescence, a genuine although small relationship exists between intelligence and physical maturing. It is not beyond the bounds of possibility that this is due to the influence of common, inherent, growth factors upon both mental and physical or physiological characteristics. Further research, however, is needed in order to determine the possible influence of racial and socio-economic factors upon these findings. In chapter ii it was noted that sexual maturing appears to occur somewhat earlier among girls of higher than of lower socio-economic status (p. 29). In view of the well-known correlation (in itself, of complex origin) between intelligence and socio-economic status, it seems probable that we shall find no single nor simple explanation of mental-physical relationships in adolescence. In any event, it should be pointed out that variations in the pattern of mental growth during puberty are much less predictable and clear-cut than the well-established variations in physical growth which occur in this period. Sex differences in the mental-growth curve are even less predictable and less easy to demonstrate.

The suggestion has sometimes been made that boys and girls in the junior and senior high school should be ordered into class groups on the basis of physical maturity rather than of chronological age. The effect of this would be to associate older boys with younger girls, in this way making up for the boys' lag in physical size and in various aspects of social maturing. While this might well serve to alleviate some of the problems which result from socially heterogeneous classes, our evidence suggests that it would create new problems of intellectual inequality, since mental growth adheres more closely to chronological age, and is less sensitive than physical growth to the effects of sexual maturing. In our present classes, based on chronological age, such sex differences in intelligence as occur, are, in general, of no practical importance. It is apparent, however, that they would become of considerable practical importance if it were necessary to communicate the same subject matter to a group consisting, for example, of fifteen-year-old

⁶ Abernethy (1) reported a significant correlation (higher among boys than among girls) between mental test scores and measures of sexual maturity, at nearly every age from nine through seventeen. Although no correlation was found between mental and physical growth *rates* in adolescence, this has been reported by Honzik and Jones (18) for children at earlier ages. For surveys of recent evidence in the field of physical-mental relationships, see references 19, 37.

boys and thirteen-year-old-girls. Perhaps a compromise, involving a partial acceleration of girls in school grade, would offer a better solution, providing this were applied with attention to individual characteristics rather than in terms of a "standardized" treatment for all.

Sex differences in general intelligence attain a little greater significance when we turn our attention to the extremes of the distribution. A hint as to what will be found here comes from those studies in which the distribution of boys, at a given age, has been reported as having a greater variability than that of girls; McNemar and Terman (29) found this to be the case in twenty-nine out of thirty-three comparisons based on age groups.⁷ The *degree* of difference in variability was taken as implying (in a normal distribution) that in general about twice as many boys as girls would achieve extremely high IQ's (above 160) and also that about twice as many boys as girls would be classified in the lower ranges of feeble-mindedness (with IQ's below 40). Various environmental factors undoubtedly enter into these results, but it is an interesting question as to whether they can be explained on a purely environmental basis. That the sex difference in the upper ranges of intelligence is not a merely temporary condition is suggested in the Stanford follow-up study of gifted children: "Boys not only become increasingly more likely than girls to have a high IQ as they advance in age, but they are more likely than girls to retain a high IQ earlier evidenced" (5: 62). These conclusions are also supported by two reports from the Harvard Study (7, 25).

III. GROWTH DIFFERENCES AMONG MENTAL FUNCTIONS

If specific items of an intelligence test are classified according to their difficulty at a given age level and compared as to their growth curves, one will be more impressed by similarities than by differences among these curves. Nevertheless, some differences can be found, as illustrated in Figure 2. This figure compares the percentage passing, at successive age levels, in three verbal tests: (a) vocabulary, (b) sentence rearrangement, and (c) a test of reasoning, all from the 1937 revision of the Stanford Binet.⁸ These tests were chosen as showing practically identical difficulty levels at age ten (20-21 per cent passing). Their growth curves are similar from eight to ten, but at later ages

⁷See also 11, 27.

⁸The data are from McNemar (28). The vocabulary test is placed at the twelve-year level of Form L (defining fourteen words); the dissected sentence test is at the thirteen-year level; and the reasoning test is at the fourteen-year level (Form M).

they differentiate sharply, such that at seventeen years only two-thirds of the standardization group pass the reasoning test, five-sixths pass the dissected sentences test, while nearly all pass the vocabulary test.

Since the growth pattern of a single item may be strongly influenced not only by its content but also by peculiarities of scoring standards, a more general view of differences among mental functions can be obtained if we turn to scores derived from groups of items. Advocates of the factor-analysis approach⁹ to the study of "primary

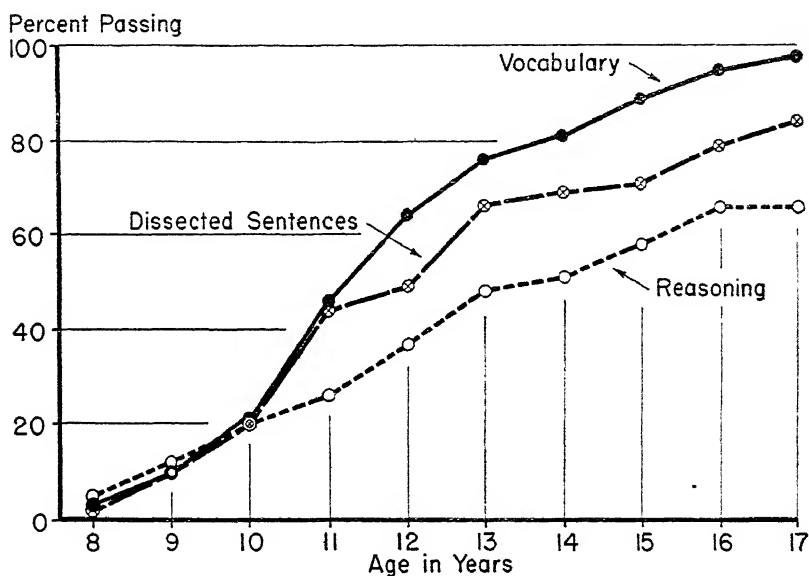


FIG. 2.—Age differentiation on three Stanford-Binet items.

abilities" have objected to growth curves based on composites, partly because of the probability, already mentioned, that unanalyzed total scores involve a varying organization of traits at different ages. Up to the present time we have no satisfactory growth curves for primary abilities, nor do we have any very adequate information as to the continuity through successive ages of the more or less independent factors which have thus far been isolated. It will be instructive, however, to consider some of the available evidence concerning test categories represented in the subtests of intelligence scales. Such subtests often consist of more or less homogeneous groups of items, assembled so as to measure as reliably as possible such relatively specific

⁹ For discussions of some of the problems in this field, see references 9, 13, 44, 50.

characteristics as are involved in vocabulary definitions, numerical problem-solving, response to analogies, etc.

When we attempt to compare the growth curves of different mental functions, we are usually handicapped by lack of directly comparable units. In one of the few studies in which the same test was given to a constant sample over a period of years, Freeman and Flory (11) have shown that during the period from ten to sixteen years, vocabulary test scores increase from 36 to 62 points, while scores on a completions test increase from 49 to 88. Do these represent similar or different rates of increase? As in Figure 1 of the preceding chapter it is possible to render such scores comparable by reducing them to standard values. Since the adult means are not available for the VACO test, the present writers have computed standard scores in terms of the means and S.D.'s furnished in the earlier study (11: 30, 36) for age ten.¹⁰ The result of this treatment is shown in Figure 3, which depicts, on the whole, rather similar growth curves for the four subtests of the VACO intelligence scale. For opposites and vocabulary tests the curves have not been drawn below thirteen years, since they lie so close to each other and to the other two curves. It will be noted that scores on completions and opposites tests have a somewhat more rapid and longer continued increase while those of the analogies test (which may be a "purer" function, less subject to cumulative educational influence) approach a relatively early limit of growth. Similar results for opposites and analogies tests are shown by a different method of presentation, in Figure 4. In this figure, from the data of Jones and Conrad (21), the tests are compared in terms of scale units based on adult performance¹¹ rather than on initial performance at age ten. Results are shown for the adult ages, in a population quite homogeneous with that of the younger group, in order that adolescent development in these two functions may be more fully evaluated with reference to adult status. It is readily seen that relative to adult performance the analogies test scores are higher than the opposites test scores at all ages during adolescence. Moreover, while the type of controlled association (and vocabulary knowledge) represented in the opposites

¹⁰ In each subtest the raw score mean at age ten was taken as zero, and the difference between the raw score means at age ten and at successive ages was divided by the S.D. at age ten; raw score averages were thus transformed into comparable measures in S.D. units. The arbitrary zero at age ten is, of course, not assumed to represent "absolute zero" for the abilities in question. A similar procedure was used in comparing age changes in motor and mechanical abilities, in chapter vii.

¹¹ For the method of computing these scale scores, see p. 151.

test reaches a mature limit at around age twenty and remains there with only minor losses, the more highly discriminative task involved in analogies reaches an earlier peak considerably higher than the per-

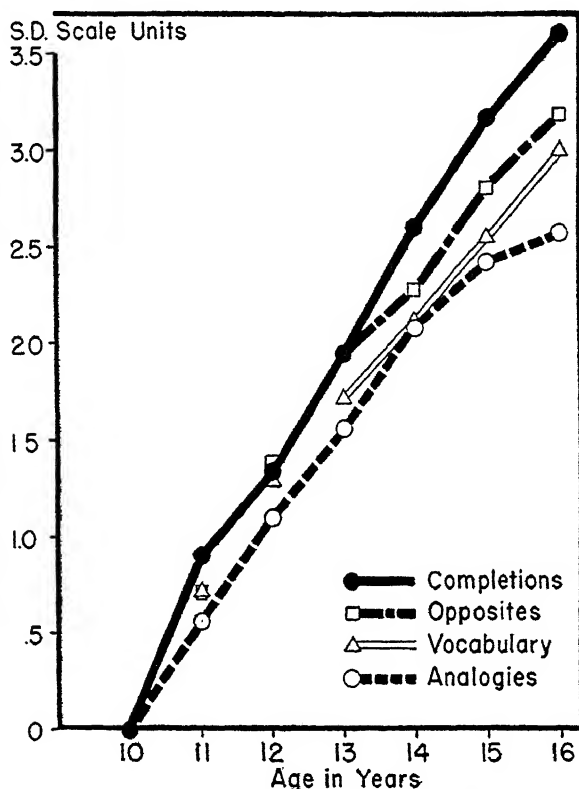


FIG. 3.—Growth curves in the VACO subtests.

formance in middle maturity, and almost immediately shows a sharp decline. A decline similar to that for analogies (though not quite so sharp or prompt) was also observed by Jones and Conrad in the "common sense" and number series completions of the Army Alpha (21: 250). The steepness of the decline in these tests was perhaps greater in this sample (a rural group) than would be the case in a group of higher social and educational status. It does however, appear that there are more differences among mental functions in their resistance to decline immediately following adolescence (or during late adolescence), than in the upward developmental sweep. It may be of some interest, in this connection, to recall Scammon's (14) finding of highly uniform development of the physical organs in the rapidly growing fetus, followed by marked divergences thereafter.

Memory for recent events is a mental function which has been regarded as discriminatory of age groups in later maturity; it has received little attention, however, in studies of adolescence. There is some evidence that the simpler forms of memory, as in memory span, reach an earlier peak than does the growth curve for general intelligence, (4, 53). But this does not appear to be the case for more complex memory functions. Table I presents a comparison, in terms of adult T-scores, between the growth of visual memory and of general

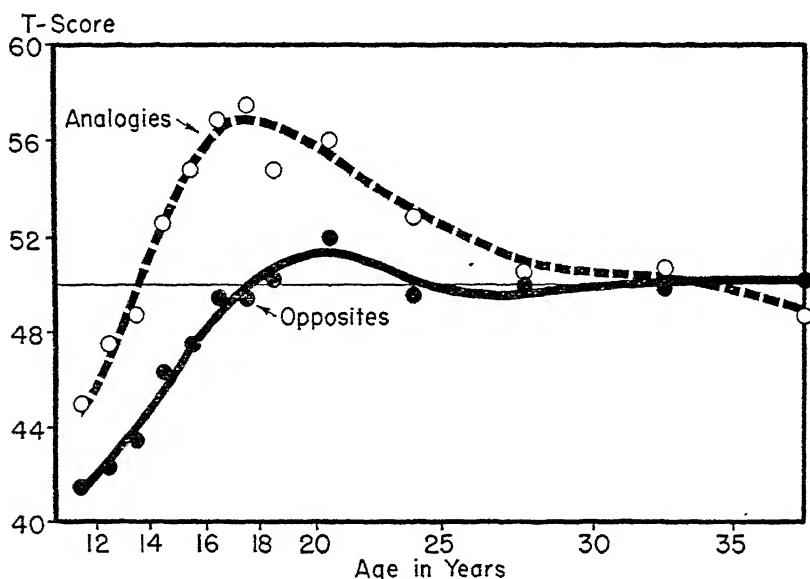


FIG. 4.—Growth curves in Army Alpha subtests (Jones-Conrad).

intelligence in similar populations.¹² The memory tests involved immediate recall for the content of a series of motion pictures; the test items were formulated at a relatively simple narrative and descriptive level. It can be seen that between the ages of ten and twelve children are less mature in this function than in general intelligence, and it is possible that they are slightly slower in reaching the mature adult level indi-

¹² The visual memory data are from a study by Jones, Conrad, and Horn (22), with a sample of 489 cases between ten and twenty-five years, and an additional sample of adults. The general intelligence measures are based on 644 Army Alpha tests in the same age range and in the same communities (21). The raw scores, for each test, have for the present purpose been transformed into T-scores on the basis of the mean and S.D. for adults between twenty-five and forty years of age, in a population homogeneous with the adolescent group.

cated by a score of 50. In general, however, the two sets of data are strikingly similar.

TABLE I.—GROWTH IN VISUAL MEMORY AND IN INTELLIGENCE
("T-SCORES")

Age in Years	Visual Memory	Intelligence
10-11.9.....	34.6	40.0
12-13.9.....	43.6	43.1
14-15.9.....	47.5	48.4
16-17.9.....	49.0	51.8
18-21.9.....	51.7	52.9
22-24.9.....	51.7	51.1

Thorndike has commented: "Adults perhaps complain oftener concerning their ability to memorize than concerning any other, and popular pedagogy has assumed that this ability has its acme in childhood and falls off during adolescence" (47: 159). The evidence presented above, as well as the implications from various laboratory studies summarized by Thorndike, do not support this popular view. With regard to the qualitative aspects of learning, thinking, and reasoning, the same writer has noted:

We have studied the work of adolescent and adult who had the same tasks to perform and the same problems to solve, . . . in search of differences in the kinds of mistakes made, the kinds of procedures adopted, and other evidences of age differences in the nature of the learning process. Most of the results were negative.

Such few age differences as do appear are usually explainable as the products of special experiences associated with age rather than as products or symptoms of a general inner change in the mind's ways of working. If we had a hundred boys of sixteen and a hundred men of thirty-six study algebra or French or history or civics for a year, and had a record of the thinking of each individual in doing so, I very much doubt whether we could do much better than guess at which was young thinking and which was old thinking, except for references to special adult experiences or special interests. In their experiences, interests, and motives adults obviously differ from adolescents, but in the nature of the learning process they are substantially alike, so far as we can see (47: 166-68).

Studies of college students (15, 36) have indicated that under the condition of continual and varied use, growth in subtests of intelligence-batteries may persist to various terminal points well beyond eighteen years. It is not at present clear whether this improvement represents some kind of transfer effect, or true growth in basic ability (of course,

if "the transfer effect" is durable, the distinction between "transfer" and "true growth" becomes of less significance).

General intelligence can be tapped not only by verbal tests, but also by nonverbal and performance tests (2, 38). In the past, such tests have been used principally for the younger ages, or for the lower intelligence levels;¹³ this is not, however, a necessary restriction, provided that tests of a suitable difficulty and nature are employed. The growth curve for Wechsler's performance scale during adolescence, as shown in Figure 5, is essentially similar to that for his verbal scale (51: 121). Two studies (17, 52) have indicated that growth in the "Ferguson boards" increases at least into the early twenties; a similar extended growth is clearly indicated by Alexander (2) in the norms for his performance scale. The growth curve for Raven's (32) test of "progressive matrices" shows, however, an earlier cessation point; perhaps this could be expected from the fact that it involves, at a non-verbal level, processes somewhat similar to those involved in the analogies test.

A performance test which apparently shows an early recession in scores is the Knox cubes. According to one study (17) the decline is as much as six percentile points between seventeen and twenty-two years; three other performance tests, in the same investigation, registered an increase between these ages. The growth curves of performance tests seem to exhibit greater differences among themselves than the curves for verbal tests; this may be a result of greater irregularities in units of measurement, the lower intercorrelations among performance tests, or both. It may also be noted that sex differences are often greater on performance tests (favoring boys) than on tests more heavily weighted with verbal components.

These differences among growth curves tend to confirm the view that changes in the nature and organization of mental ability occur with age. Further evidence on this point can be obtained from several sources, including data based on comparison of intercorrelations or of factor analyses for successive ages. McNemar (28) has shown that in the revised Stanford-Binet a single common factor accounts for the intercorrelations among items, and this common factor remains substantially the same from age to age. He points out, however, that the test items were originally selected on the basis of certain criteria (such as correlation with total score, and satisfactory progression with age) which would tend toward a single common factor and might lead us

¹³ The tests of the Pintner-Paterson Performance Scale, for example, show their chief age gains (with a few exceptions) prior to eleven years (31).

to expect a high degree of continuity of this factor from one age to the next. Thorndike has also claimed, for the CAVD, that "different levels measure much the same thing" (46). This claim, however, is based on so complicated a system of comparisons and statistical corrections that we are justified in seeking more direct evidence.¹⁴ In general, studies of the intercorrelation of mental functions suggest that with increasing age the functions constituting many of our common

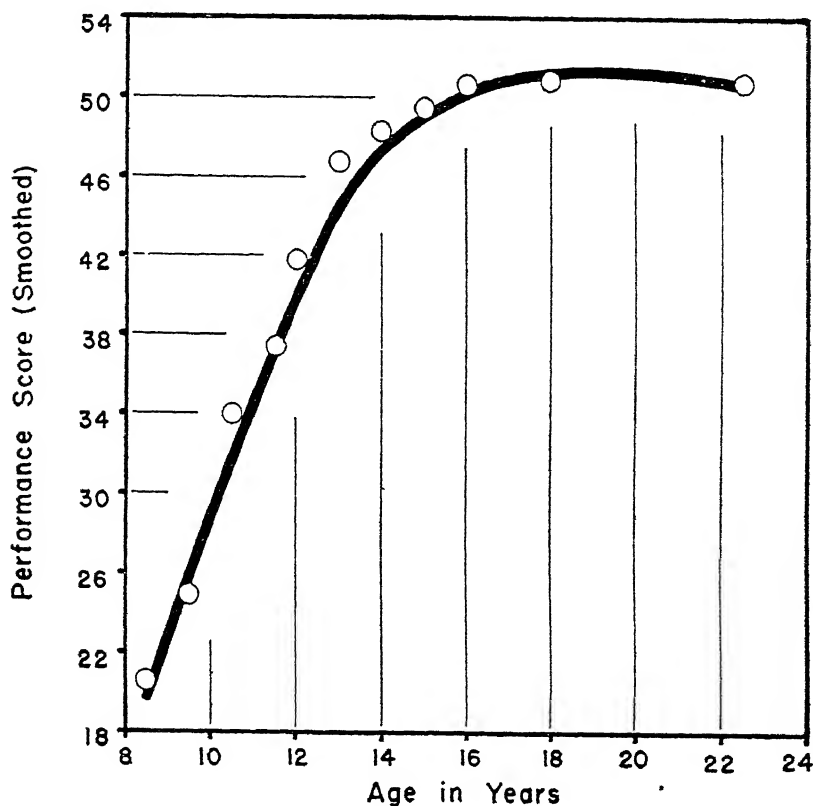


FIG. 5.—Growth on a performance scale.

intelligence tests tend to pull apart, i.e., they become less highly correlated and more specific in nature (12). While this may be partly a matter of individuals acquiring different ability specializations, in part it is no doubt due to more basic characteristics of mental growth. If, as we have seen, different mental functions have somewhat different

¹⁴ See Hertzmann (16) for an analysis of the statistical assumptions in Thorndike's study.

courses and limits of growth, it is not surprising that the divergence of curves should be accompanied by other changes in mental organization. The varying pattern of abilities in "total intelligence" is also shown by the fact that during adolescence the relative importance of subtests may change, some tests making a larger and others a smaller contribution to total score (21). Thus, the study of mental development in adolescence can be seen to involve many problems of differential growth.

The data presented in this section indicate that the functions measured by some tests level off at early and middle adolescence and that the functions measured by other tests continue to improve until the end of the college period—at least in the case of those who maintain their formal education to this point. It has already been pointed out that the meaning of this fact is uncertain. It may mean that some functions, like simple rote memory, mature early, while others, like ability to comprehend abstract disciplines, mature later. A further possibility is that the maturing of memory depends mainly on organic growth, while the maturing of ability in the scholarly disciplines depends on training following the completion of organic growth. It may well be that this statement presents too sharp a contrast in hypotheses and suggests too complete a cleavage between organic maturing and education. The difference may rather be one of degree. This seems the most probable conclusion.

If this conclusion is the correct one several practical consequences may be suggested. The chief educational implication seems to be that the full realization of the individual's intellectual capacity, expressed in terms of general achievement, comes much later than the middle teens. Whether we explain the process by which this realization comes as organic maturing or as education or as a combination of the two does not matter. What matters is that the process takes time and that training is one of the factors in bringing it about.

As this is being written a movement is under way to enact laws which will permit eighteen-year-olds to vote. Various arguments can be adduced in favor of this change. If, however, it is contended that voting should await the full development of the intellectual powers, the burden of evidence does not support the proposal.

In order to secure the full development of intelligence, either to fit the individual for his highest vocational attainment, or for discharging the responsibilities of citizenship or for realizing the fullest development of personality, it is essential to continue general education beyond the teens. This does not imply full-time schooling for

all. For many it means participation in adult education. Many persons can better carry forward the later stages of this intellectual development in association with the prosecution of a vocation rather than as a full-time enterprise. Unfortunately, our society has not yet succeeded in extending the facilities of adult education to anything like the degree that is desirable. To do so should be one of the chief aims of education in the postwar world.

An implication of the findings for mental measurement may be mentioned. One of the aims of this field of applied science has been to find means of measuring *inherent* capacity and growth. So far as the later stages of development of the higher intellectual powers are concerned this aim seems incapable of realization. Without training, the later stages are not evidenced. Realization of full potentialities, even in the earlier stages, probably also depends, in part, on training. Failure to recognize this fact may lead to the denial of the existence of intellectual development because it does not appear in our measurements. This would be a mistake. It is desirable to free our tests so far as possible from the effects of specific variations in training, but to free them from the general effects of education is probably impossible. To seek to do so is to restrict the tests to the measurement of narrow and perhaps unimportant functions.

IV. INTELLIGENCE AND ADJUSTMENT

One of the more common sources of worry and anxiety in the life of the adolescent (in our contemporary American culture) involves the question of whether he will be successful in meeting intellectual requirements. Passing examinations, "making the grade," getting promoted, gaining a place on the honor roll, or escaping unfavorable notice for low marks, are among the common preoccupations of pupils in the upper grades of our public school systems. The urgency of these demands is not greatly reduced by the fact that they are often unrelated to the children's own dominant values, for even those who are least appreciative of intellectual attainments nevertheless seek to avoid being regarded as failures because of stupidity. It might then be expected that intellectual handicap would be prominently related to measures of personal and social adjustment. Such has not proved to be the case. It is true that gifted children tend to attain favorable scores in assessments of personality traits; on the other hand we know that many types of problem behavior are associated with below-average mentality. But within a normal range of school children correlational studies have in general failed to exhibit any significant re-

lationship between these variables. The reason for this is, of course, that the importance of intellectual status is usually relative to what is expected of a person and what he himself wants. In the mass, intelligence offers little or no prediction as to personal adjustment. But individuals are rare who have not at one point or another encountered personal problems related to their efficiency in mental tasks. So complex and pervasive is the relation between intellectual and emotional factors in the personality, that we may find here an additional reason for a school to build up adequate knowledge as to the mental capacities of the pupils within its care. From the point of view of this year-book, such knowledge should be employed not merely to adapt teaching methods and content to the ability of the individual learner, but also with some responsibility for understanding the role of intellectual processes in the child's total adjustment.

At least five factors are involved in the relation between intelligence and adjustment. These are the child's absolute level of intelligence; the level of intelligence required in the activities toward which he is being pointed, through the ambitions of his family and friends; the social pressures which arise from such ambitions; his own "felt needs" and level of aspiration; and his actual achievement. These factors are interconnected in a variety of ways and a great variety of complex patterns may result.

In view of the number of factors and of the ways they may be combined, it is no wonder that no direct, statistical correlation appears between IQ and adjustment. This, however, does not imply that mental ability is not a factor and does not need to be taken into account by the parent and the teacher. In relation to intelligence, pressure to achieve at a given level may be a healthy stimulus to one youth and a highly disorganizing stimulus to another. The personality of the individual must also be taken into account. One may be able to stand the strain of a high level of aspiration in relation to ability, another may not.

Again, much depends on the relation between the individual's ability and the level of talent demanded by his occupation. If his ability is above that required by his occupation he may become restless and discontented, or he may, like Charles Lamb and Nathaniel Hawthorne, find satisfaction in other pursuits. If, on the other hand, his ability is inadequate, he may crack under the strain of trying to meet the demands, or he may resign himself to the inevitable. In the latter case he may become a drifter, or may establish himself in a new occupation that is more appropriate to his intelligence level.

It is safe to say that, in spite of the absence of any simple relationship, the degree of ability does have an important relation to adjustment. What this relation is, and its practical implications, must be discovered through an analysis of each individual case.

REFERENCES

1. ABERNETHY, E. M. *Relationships between Mental and Physical Growth*. Monographs of the Society for Research in Child Development, Vol. I, No. 7. Washington: National Research Council, 1936. Pp. vii + 80.
2. ALEXANDER, W. P. "Intelligence, Concrete and Abstract." *British Journal of Psychology Monograph Supplements*, No. 19: 1935. Pp. 177.
3. BAYLEY, N. "Factors Influencing the Growth of Intelligence in Young Children," *Intelligence: Its Nature and Nurture*, pp. 49-79. Thirty-ninth Yearbook of the National Society for the Study of Education, Part II. Chicago: National Society for the Study of Education (5835 Kimbark Avenue), 1940.
4. BRONNER, A. F.; HEALY, W.; LOWE, G. M.; and SHIMBERG, M. E. *A Manual of Individual Mental Tests and Testing*. Boston: Little, Brown & Co., 1927. Pp. x + 287.
5. BURKS, B. S.; JENSEN, D. W.; and TERMAN, L. M. *Genetic Studies of Genius, III. The Promise of Youth*. Stanford, California: Stanford University Press, 1930. Pp. xiv + 508.
6. CATTELL, P. "Constant Changes in the Stanford-Binet IQ," *Journal of Educational Psychology*, XXII (1931), 544-50.
7. ———. "Do the Stanford-Binet IQ's of Superior Boys and Girls Tend to Decrease or Increase with Age?" *Journal of Educational Research*, XXVI (1933), 668-73.
8. CONRAD, H. S.; JONES, H. E.; and HSIAO, H. H. "Sex Differences in Mental Growth and Decline," *Journal of Educational Psychology*, XXIV (1933), 161-69.
9. CRAWFORD, A. B. "Some Observations on the Primary Mental Abilities Battery in Action," *School and Society*, LI (1940), 585-92.
10. DEARBORN, W. F.; ROTHNEY, J. W. M.; and OTHERS. *Predicting the Child's Development*. Cambridge, Massachusetts: Sci-Art Publishers, 1941. Pp. 360.
11. FREEMAN, F. N., and FLORY, C. D. "Growth in Intellectual Ability as Measured by Repeated Tests." Monographs of the Society for Research in Child Development, Vol. II, No. 2. Washington: National Research Council, 1937. Pp. xi + 116.
12. GARRETT, H. E.; BRYAN, A. I.; and PERL, R. E. *The Age Factor in Mental Organization*. Archives of Psychology, No. 176. New York: Columbia University, 1935. Pp. 29.
13. GUILFORD, J. P. "Human Abilities," *Psychological Review*, XLVII (1940), 367-94.
14. HARRIS, J. A.; JACKSON, C. M.; PATERSON, D. G.; and SCAMMON, R. E. *The Measurement of Man*. Minneapolis, Minnesota: University of Minnesota Press, 1930. Pp. 215.

15. HARTSON, L. "Does College Training Influence Test Intelligence?" *Journal of Educational Psychology*, XXVII (1936), 481-91.
16. HERTZMAN, M. *The Effects of the Relative Difficulty of Mental Tests on Patterns of Mental Organization*. Archives of Psychology, No. 197. New York: Columbia University, 1936. Pp. 69.
17. HESTON, J. C., and CANNELL, C. F. "A Note on the Relation between Age and Performance of Adult Subjects on Four Familiar Psychometric Tests," *Journal of Applied Psychology*, XXV (1941), 415-19.
18. HONZIK, M. P., and JONES, H. E. "Mental-Physical Relationships During the Preschool Period," *Journal of Experimental Education*, IV (1937), 139-46.
19. JONES, H. E. "Relationships in Physical and Mental Development," *Mental and Physical Development*, pp. 91-102. Review of Educational Research, IX, No. 1. Washington: American Educational Research Association, 1939.
20. ———. Unpublished mss. Institute of Child Welfare, University of California, Berkeley.
21. JONES, H. E., and CONRAD, H. S. *The Growth and Decline of Intelligence: A Study of a Homogeneous Group between the Ages of Ten and Sixty*, pp. 223-98. Genetic Psychology Monographs, Vol. XIII, No. 3. Worcester, Massachusetts: Clark University, 1933.
22. JONES, H. E.; CONRAD, H. S.; and HORN, A. "Psychological Studies of Motion Pictures. II. Observation and Recall as a Function of Age," pp. 225-43. University of California Publications in Psychology, Vol. III. Berkeley, California: University of California Press, 1928.
23. KEENE, C. M., and STONE, C. P. "Mental Status as Related to Puberty Praecox," *Psychological Bulletin*, 34: 1937, 123-33.
24. KUZNETS, G. M., and McNEMAR, O. "Sex Differences in Intelligence-Test Scores," *Intelligence: Its Nature and Nurture*, pp. 211-20. Thirty-ninth Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education (5835 Kimbark Avenue), 1940.
25. LINCOLN, E. A. "The Stanford-Binet IQ changes of Superior Children," *School and Society*, XLI (1935), 519-20.
26. McMANAMA, SISTER MAURICE. *A Genetic Study of the Cognitive General Factor in Human Intelligence*. Studies of Psychology and Psychiatry, Catholic University of America, Vol. IV, No. 2. Washington: Catholic University of America, 1936. Pp. 35.
27. MACMEEKEN, A. M. *The Intelligence of a Representative Group of Scottish Children*. London: University of London Press, 1939. Pp. xv + 143.
28. McNEMAR, Q. *The Revision of the Stanford-Binet Scale*. Boston: Houghton Mifflin Co., 1942. Pp. 189.
29. McNEMAR, Q., and TERMAN, L. M. *Sex Differences in Variational Tendency*. Genetic Psychology Monographs, Vol. XVIII No. 1. Worcester, Massachusetts: Clark University, 1936. Pp. 66.
30. ODOM, C. L. "A Study of the Mental-Growth Curve with Special Reference to the Results of Group Intelligence Tests," *Journal of Educational Psychology*, XX (1929), 401-16.

31. PINTNER, R., and PATERSON, D. G. *A Scale of Performance Tests*. New York: D. Appleton Co., 1917. Pp. ix + 217.
32. RAVEN, J. C. "Standardization of Progressive Matrices," *British Journal of Medical Psychology*, XIX (1941), 137-50.
33. RICHARDSON, C. A., and STOKES, C. W. *The Growth and Variability of Intelligence*. British Journal of Psychology Monograph Supplements, Vol. XVIII. London: British Journal of Psychology, 1933. Pp. 83.
34. ROBERTS, J. A. F., and GRIFFITHS, R. "Studies on a Child Population. II. Retests on the Advanced Otis and Stanford-Binet Scales, with Notes on the Use of a Shortened Binet Scale," *Annals of Eugenics*, VIII (1937), 15-45.
35. ROFF, M. E. "A Statistical Study of the Development of Intelligence-Test Performance," *Journal of Psychology*, XI (1941), 371-86.
36. ROGERS, A. L. "The Growth of Intelligence at the College Level," *School and Society*, XXXI (1930), 693-99.
37. SHOCK, N. W., and JONES, H. E. "Mental Development and Performance as Related to Physical and Physiological Factors," *Growth and Development*, pp. 531-52. Review of Educational Research, Vol. XI, No. 5. Washington: American Educational Research Association, 1941.
38. STEPHENSON, W. "Tetrad Differences for Nonverbal Subtests," *Journal of Educational Psychology*, XXII (1931), 167-85.
39. STODDARD, G. D. *The Meaning of Intelligence*. New York: Macmillan Co., 1943. Pp. ix + 504.
40. STONE, C. P., and BARKER, R. G. "Aspects of Personality and Intelligence in Postmenarcheal and Premenarcheal Girls of the Same Chronological Age," *Journal of Comparative Psychology*, XXIII (1937), 439-45.
41. STONE, C. P., and DOE-KUHLMANN, L. "Notes on the Mental Development of Children Exhibiting the Somatic Signs of Puberty Praecox," *Guidance in Educational Institutions*, pp. 388-97. Twenty-seventh Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education (5835 Kimbark Avenue), 1928.
42. THOMSON, G. H. "A Formula to Correct for the Effect of Errors of Measurement on the Correlation of Initial Values with Gains," *Journal of Experimental Psychology*, VII (1924), 321-24.
43. ———. "An Alternative Formula for the True Correlation of Initial Values with Gains," *Journal of Experimental Psychology*, VIII (1925), 323-24.
44. ———. *The Factorial Analysis of Human Ability*. Boston: Houghton Mifflin Co., 1939. Pp. xv + 326.
45. THORNDIKE, E. L. "The Influence of Chance Imperfection of Measures upon the Relation of Initial Score to Gain or Loss," *Journal of Experimental Psychology*, VII (1924), 225-32.
46. THORNDIKE, E. L., and OTHERS. *The Measurement of Intelligence*. New York: Bureau of Publications, Teachers College, Columbia University: 1926. Pp. xxvi + 616.
47. THORNDIKE, E. L.; BREGMAN, E. O.; TILTON, J. W.; and WOODYARD, E. *Adult Learning*. New York: Macmillan Co., 1928. Pp. x + 335.

48. THURSTONE, L. L. "A Method of Scaling Psychological and Educational Tests," *Journal of Educational Psychology*, XVI (1925), 433-51.
49. THURSTONE, L. L., and ACKERSON, L. "The Mental-Growth Curve for the Binet Tests," *Journal of Educational Psychology*, XX (1929), 569-83.
50. THURSTONE, L. L., and THURSTONE, T. G. *Factorial Studies of Intelligence*. Psychometric Monographs, No. 2. Chicago: Published for Psychometric Society by University of Chicago Press, 1941. Pp. v + 94.
51. WECHSLER, D. *The Measurement of Intelligence*. Baltimore, Maryland: Williams & Wilkins, 1939. Pp. ix + 229.
52. WOOD, L., and KUMIN, E. "A New Standardization of the Ferguson Form Boards," *Journal of Genetic Psychology*, LIV (1939), 265-84.
53. WRIGHT, M. B. "The Development of Mental Ability at the College-Adult Level," *Journal of Educational Psychology*, XXII (1931), 610-28.
54. ZIEVE, L. "Note on the Correlation of Initial Scores with Gains," *Journal of Educational Psychology*, XXXI (1940), 391-94.

SECTION III

THE ADOLESCENT AND THE SOCIAL ORDER

CHAPTER X

THE ADOLESCENT IN TECHNOLOGICAL SOCIETY

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The adolescent today must in some way adjust to a culture that is characterized by instability, confusion, and conflict. Turn where he may or do what he will, he cannot escape the forces that are creating a novel, baffling, and, far too often, a tragic world. These forces stem, in the main, from science and invention translated into technology. Caught in the grip of a great technological revolution, our society is undergoing changes no less significant than those produced by the shift from a feudal to a capitalistic economy or by the industrial revolution in the late eighteenth and early nineteenth centuries.

The effects of technology in a culture may be observed after a period of time at any one of three levels. At first there is the ready acceptance and use of the new products of technology. Old machines and gadgets and more efficient forms of management are readily abandoned for new and better ones. The automobile, the radio, the airplane, and assembly line, and whatever else science and invention may bring forth to improve material existence are accepted and put to use without too much thought about ultimate social consequences. But changes in the material aspects of the culture inevitably bring with them the need for institutional reorganization. Sooner or later all the great social institutions—family, community, religion, economy, and government—begin to yield to the impact of technological change. Science and invention come to be the great disturbers of the ways of men, and it is observed that invention is no less important at the level of social institutions than in the realm of material things; and society is stimulated to cultivate the spirit of contrivance and experimentation

in every area of social relations whether of economy, government, or ethics.

Finally, as men proceed to weave a new pattern of institutional life, old value systems are called into question, and conflicting ideologies emerge. Men and nations find themselves standing at the crossroads of policy, seeking a new orientation and sense of direction. Thus, in our own day three value systems—Nazism, Communism, and capitalistic democracy—are locked in mortal combat, such that peace in any part of the world seems to depend upon the elimination of the first and the establishment of a working arrangement between the latter two. On many lesser theaters of action, too, men are struggling with the endless task of reconstructing their institutions and of reassessing their core values. As adolescents move from the more sheltered world of childhood into the more responsible world of adults they come face to face on every highway and byway of life with the forces that are transforming their culture. The adjustments they make to the situations created by these forces become, in no small measure, the strands out of which their personalities are woven.

I. PROBLEMS OF POPULATION CHANGE

Problems growing out of population change intrude into practically every aspect of American life and affect directly or indirectly every element in the population. All the evidence points to the conclusion that these problems will be of increasing importance as they affect children and youth.

The small family pattern which appeared in southern New England somewhat more than a century ago is now being adopted in varying degrees by all elements of the population, urban and rural, Protestant and Catholic, white and black, native and foreign born. As a result the net reproduction rate in 1940 was .96, or 4 per cent below the rate necessary to maintain a stable population. During the early stages of the war the birth rate rose sharply, but during the war it will probably drop to a new low. Shortly after the war is over the birth rate may be expected to rise sharply but this must not be regarded as a reversal of the long-term downward trend. There are reasons that lead one to believe that the postwar period of high birth rates will be of short duration. The war will accelerate the spread of contraceptive methods and create attitudes and conditions unfavorable to high fertility. Barring immigration, natural increases may be expected to fall off rapidly and within two or three decades following the peace the population of the nation will reach a peak and begin to decline.

Declining fertility affects significantly the age composition of the population. The number of young people under twenty years of age is decreasing, both relatively and absolutely. Between 1930 and 1940 the percentage of the population in this age group decreased from 38.8 per cent to 34.5 per cent. During this same decade the number of children and youth under twenty decreased by somewhat more than two million. During this decade, too, the median age of the population increased from 26.4 to 29.0 years (10: 824). The evidence indicates that proportionately the age group under twenty will continue to decline, and that by 1980 it will constitute only about one-fourth of the total population (20: 288).

The changing age structure of the population has affected and will continue to affect significantly the status of youth in society. In some areas of life youth finds itself in an advantageous position and in others it labors under severe handicaps. With relatively fewer young dependents to care for, society is in a position to take a new attitude toward childhood and youth as a period of growth and adjustment, and, other things being equal, to provide an enriched program for physical, cultural, and intellectual development (5: 14 ff). In the future one may confidently expect a deepening concern with the welfare of the oncoming generation. It appears that the time is not far distant when as a nation we shall have to formulate a population policy in which childhood and youth will occupy an extremely favorable position. In time measures will have to be taken to arrest the downward trend in fertility and to induce a birth rate high enough to maintain a stable population. To do this will probably require a vast program of distributional reforms in the interest of children and youth. The opportunities for growth and development on the part of the oncoming generation will be expanded and the cost of providing these opportunities will probably be transferred, in large measure, from the family to society (15: chaps. vi and vii). In fact, the highly favored position of youth both in the home and in the society may well come to constitute a psychological hazard which will have to be carefully guarded against.

In the meantime, however, the changing age structure of the population will operate to make it difficult for youth to pry open the doors of occupational opportunity. The productive age group from twenty to sixty years of age will change very little as a population element for several decades while youth, as we have seen, will be decreasing relatively (19: 13). As the ratio of younger to older persons declines it will become increasingly difficult for youth to gain entrance into

gainful occupations or to find opportunity to acquire the work experience so essential for their social maturation; at every turn they will find themselves in competition with a growing company of adults. The experience of the 1930's revealed that unemployment bore down hardest on out-of-school youth under twenty. In our industrial society, for most youth, work experience is no longer afforded in some common family enterprise; it must come, as a rule, through paid employment. It would seem, therefore, that in the future steps should be taken to provide youth, either in private industry or in public enterprise, with the work opportunity requisite for their development.

Regional differentials in reproduction give rise to conditions that vitally affect developmental opportunities for youth. From Maine to Oregon and north of the Mason-Dixon line, the West North Central and the Mountain States are the only census divisions in which fertility is high enough for family replacement. In the Southern and Rocky Mountain States reproduction is taking place at a rate materially higher than necessary for family replacement. In 1940 the net reproduction rate was below unity in the following geographic divisions: Middle Atlantic, 77; New England, 84; Pacific, 85; East North Central, 92. In other words, in these areas the birth rate varied from 8 to 23 per cent below what was required to replace the existing population. In other geographic divisions fertility was above the level required for family replacement: Mountain States, 123; East South Central, 120; West South Central, 109; South Atlantic, 107; and West North Central, 101. In 1940 in one group of states the number of children under five years of age per thousand women twenty to forty-four years of age was as follows: California, 328; Massachusetts, 329; New Jersey, 294; New York, 289. For another selected group of states the ratios were: New Mexico, 666; Utah, 593; South Carolina, 586, West Virginia, 565.

Urban-rural differentials in fertility are equally striking. The 1940 census revealed that in the urban population fertility was only 74 per cent of the requirement for family replacement, while among farmers it was 44 per cent above the rate required to maintain a stable population (10: 818). These differentials result in a striking imbalance in the distribution of the burden of caring for the oncoming generation. In some areas adults in the economically productive age group are carrying a burden of young dependents fully twice as great as that carried by adults in other areas. And this unequal distribution of the social responsibility of inducting youth into our culture takes on special significance when considered in relation to planes of living, economic

capacity, and cultural resources. A county-by-county analysis of the planes of living of all the counties in the United States reveals that, with relatively few exceptions, counties having a high fertility are characterized by a low plane of living (5: 58ff.). In the middle 1930's more than one-half of the nation's children were being born into homes with an annual income of less than a thousand dollars. It is also to be observed that the areas of high fertility are low on practically every measure of cultural resources when compared with the national norm. For example, a county-by-county analysis of the percentage of the population above twenty-five years of age having a seventh-grade education or better reveals that, as a rule, counties with a high birth rate are also counties in which educational accomplishment is low.¹ When all the facts are brought into focus we get a picture something like this: In counties where the plane of living is high, where economic resources and opportunity are most abundant, where community resources are the richest, and where the cultural-intellectual status of parents is the highest, fertility is usually materially below that required for family replacement. In counties where the per capita income is far below the national norm, where the cultural heritage is the poorest, where the plane of living is the lowest, where community resources are the most meager, and where parents have least to contribute to the cultural-intellectual development of youth, fertility is materially above the replacement level. Clearly, such differential fertility makes it extremely difficult to realize the American ideal of reasonably equal opportunity; it is an important factor in determining the chance that youth will have for physical, cultural, and intellectual growth and for economic adjustment.

American adolescents are growing up in a world characterized by a more or less constant reshuffling of the population. Migration as a social phenomenon may be regarded as a means of maintaining something of a balance between population and resources. In general, people tend to move from areas where the pressure of population on the resource structure is intense to areas of less intense pressure. This being the case, the families of many adolescent youth, and many adolescent youth on their own account, may be expected to migrate in search of economic and social opportunities. During the 1920's approximately two-fifths of the youth who took up work in factories, stores, and offices had been reared on farms (17: 110). This outward movement of youth from farms was checked but by no means stopped by the de-

¹Based upon unpublished data prepared by Herman G. Richey and Newton Edwards.

pression of the 1930's (21: 1). Many factors are operating to make it reasonably certain that during the next few decades a very large fraction of the boys and girls born on farms will seek their fortunes in towns and cities. In 1930 farmers were having about 60 per cent more children than necessary to maintain a stable population, and the number of farm boys becoming eighteen years of age was more than twice the number required to fill the places being made vacant by the death and senescence of their elders (14: 13). Moreover, due to mechanization and other forces, agriculture faces a long-time trend of diminishing employment opportunity.

II. THE CHANGING PATTERN OF OCCUPATIONAL LIFE

The relation of the adolescent to the world of creative work is of supreme importance whether considered from the point of view of personality development or as a means of inducting youth into gainful employment. In our industrial society conditions are such as to make it extremely difficult to provide youth with the work experience so essential for normal personality development and it is even more difficult to open up for youth avenues leading to gainful employment of a kind that gives tone and zest to life. It is a significant fact that for most youth today creative labor must be had in factory, shop, or office instead of in communal family relations. But when youth turn from home and school to find part-time or full-time employment, they are faced by the ominous fact that our economy, in peace time, cannot make full use of their productive energy. (1: chap. i). It cannot be overstressed that many of the major problems of youth are not discrete; that they are not problems merely characteristic of youth; they lie rather in the heart of the structure and operation of our economy. The impact of technology has so changed the structure of the economy that the old principles governing its operation will no longer work. And until these principles are changed to conform to the new structure or until the new structure is modified so that the old principles will work, we may expect the continuance of an economy that is able to utilize only a fraction of the total human resources. Nor can the fact be overlooked that youth will continue to find it difficult to pry open the doors of employment opportunity so long as a large percentage of the older workers of the community are only partially employed. So long as the gains of technology are not mass gains, so long as full employment is denied older workers, youth will still stand at the threshold of occupational life, baffled and frustrated unless special provisions be made for them (3).

The present pattern of occupational life presents still other difficulties. Youth face a bewildering choice of vocations about which they know little as to the requirements or rewards. Moreover, no matter what choice they make, most youth will find themselves in jobs requiring a low order of skill. Relatively few of them, as they perform simple and highly repetitive operations, may be expected to attain an integrated view of the total accomplishment of which their job is only a minor part. And finally, youth may experience great difficulty in reconciling the ideals of freedom and initiative cultivated in home and school with actual working conditions. As our economy now operates, there is little opportunity for the exercise of individual initiative except on the part of a few who occupy positions near the apex of authority of the particular enterprise involved. More and more the individual worker is subject to supervision and control. This conflict of values in school and in life has in it the seeds of personal frustration. One may well wonder what happens to the individual who passes from a child-centered school to an assembly-line economy.

III. THE NEW MEANING OF LEISURE

Technology has done much to rob youth, while still in school, of the opportunity to share in the work of the community and at the same time it has stripped from the full-time job much of the satisfaction that comes from the exercise of individual initiative and from the feeling that one is engaged in a worth-while creative enterprise. More and more the worker is being forced to surrender his skill to the machine and his knowledge to the technician. But if the job does not call forth the qualities of the artisan, the artist, or the philosopher, neither does it demand long hours of toil. Leisure has become a new and exceedingly important element in our culture. If the machine splinters personality, if it fails to call into play the whole physical, intellectual, or emotional self of the worker, leisure, properly conceived and utilized, can be relied upon to restore the organic wholeness of experience. But if leisure is to open up avenues in the life of the individual that lead to creative activities as wide and deep and varied as are needed to challenge the human spirit, it must be something more than the opportunity to entertain one's self with the gadgets and material products of technology or to sit passively by while watching the activities of paid performers. As never before, youth today faces the challenge of the new leisure. To meet it successfully they must ultimately be equipped with varied skills and wide knowledge—with the skills, knowledge, interests, and imagination required of creative workers whether in the

area of the fine arts, social reform, politics, or ethics. In a technological society, education for leisure is a matter of serious import.²

IV. THE IMPACT OF A NEW ECONOMIC ORDER

The changes in the structure and operation of the American economy produced by a technological revolution are of serious import for each oncoming generation of youth. A new economic system has emerged which is characterized by the concentration of economic power in the hands of a few large corporations, by the concentration of control and ownership of corporate enterprise, by restricted competition, by inflexible prices in large segments of the economy, by the high concentration of profits and income, by a congested flow of savings into investment, and by a partial use of both natural and human resources. A free enterprise economy in which the market mechanism could be relied upon to co-ordinate the numerous activities that went to make up the economic life of the people has given place, in large measure, to an administered economy.

For some decades before the outbreak of World War II the American economy was so administered that a large part of the gains of technological advance accrued to a relatively small element of the population. During the 1930's, for example, about 2 per cent of the families and single individuals of the nation were the recipients of 55 per cent or more of the dividends paid by corporations (23: 49). For the ten-year period ending in 1937, about 35 per cent of the annual outgo of corporate dividends went to twenty-five thousand individuals. And for some decades before 1940 less than 0.1 per cent of the families and single individuals were receiving about 40 per cent of the dividends of corporate enterprise (23: 50-51). In the middle 1930's approximately 42 per cent of American families were recipients of incomes of less than \$1,000 (16: 2). In 1929, 0.1 per cent of the families in the higher income brackets received as large a share of the total national income as 42 per cent at the bottom of the scale (11: 56). It is clear that the new structure of the American economy and the new principles governing its operation were making it increasingly difficult to realize the old ideal of equality of opportunity. As the prewar years drew to a close even he who ran could read inequalities of condition and opportunity which a democracy could not tolerate, nor perhaps long endure. In the struggle for status, inherited wealth and position were beginning to

² For a more extended discussion of this topic see the General Report of the American Youth Commission (1: chap. xviii) and Lindeman (12: 59-66).

count for more than energy and capacity; a class-structured society was definitely taking form (2).

Of great importance for youth is the all too obvious fact that our economic system now operates to make social mobility more difficult. Social mobility—the opportunity to climb the ladder of economic and social opportunity regardless of inheritance—has always lain very close to the heart of our democratic life. It was a force that drew colonists across the seas and impelled pioneers across a continent. For centuries American youth have exhibited initiative and a high level of expectation. Youth are still encouraged to entertain a high level of expectation and they are taught that, if they accept the core values of their society and work hard, their expectations will be measurably realized. But the direction our economy has taken in recent decades has made it increasingly difficult for the masses of young people to climb very far up the ladder of economic and social opportunity. And what is the remedy? Shall youth be taught to lower their level of expectation, to abandon the ideal of social mobility for social adjustment? Are they to be encouraged to hold fast to the old ideal of social mobility even though most of them will experience failure in its realization? Or will they be encouraged to set their hands to the long and arduous task of so modifying the economy as to make possible the realization of the older ideal of equal opportunity in a mobile society? These are questions which youth and their mentors cannot well evade (8: 1-17, 18-41; 18: chap. vi).

V. FROM SOCIAL DRIFT TO SOCIAL PLANNING

One of the essential distinctions between the age that appears to be drawing to a close and the one that is opening is the difference of concept with respect to the ways and means of human progress. The very concept of progress—the idea that man through conscious effort could continuously improve his environment and enrich the quality of living—did not appear in our western culture until near the middle of the eighteenth century. It took form in a society that was being transformed from a feudal to a capitalistic basis and capitalism gave it much of its essential content. In their struggle to eliminate the restrictions of mercantilism and to throw off the control of state and church, the capitalists came to accent personal freedom. Over against the divinity of kings they set the natural rights of the individual. The capitalist was bent upon freeing himself from restraint whether in the area of government, business, conscience, or speech. The spirit of individualism and laissez-faire came to dominate the capitalistic culture

on a wide front. The countless efforts of individuals to promote their own self-interest would add up to the social good.

But reliance upon individualism and more or less automatic adjustment in the broad area of social relationships worked none too well in a society that was becoming more and more integrated as a result of technological change. Failure to plan a world order, refusal to design and execute some over-all policy system, repeatedly led to armed conflict. Nor did reliance on the processes of automatic adjustment work any better in the area of domestic affairs. As the 1930's drew to a close, it was clear that however much we may have clung to the concept of free-enterprise or taught our children to revere it, it was in reality passing from the American scene. The policy system inherited from the nineteenth century would no longer work in the new economy created by technological revolution. Whether it was socially desirable or politically possible to restore free competition or whether the way out was to design some new pattern of economic arrangements was a matter about which men disagreed. The war pushed the solution of this problem into the background but no one can suppose that it will not reappear on the agenda of democracy with the coming of the peace. Nor can any one doubt that the solution of this problem—and many others of serious import—will be sought through plan and design.

This shift from faith in automatic adjustment to reliance on social design is creating for youth a vastly different world. The area of their interest and concern must of necessity extend beyond the primary social relationships of home, school, and community into the area of the great society. If youth are to be prepared to meet the demands of social technology, if they are to play their part in social experimentation, they must enter into adult life with a far deeper understanding of the workings of our economic, political, and societal arrangements than their elders have ever done. One of the most pressing needs of youth in the modern world is the acquisition of that breadth and precision of knowledge which will be required of them to play their role in social experimentation.

VI. CULTURAL CONFUSION AND THE CONFLICT OF VALUES

A body of core values is essential for a society and for each of the individuals who go to make it up. If a society is not to disintegrate into a mere aggregate of individuals, its members must entertain a body of common ideals and loyalties, they must have a common sense of reality. And if the individual is to achieve integration of personality, he must orient his behavior in terms of a value system that gives mean-

ing and direction to life. As pointed out previously, the impact of technology on our culture has profoundly disturbed our value system. Division of labor and specialization of function have tended to splinter experience, to set special-interest group against special-interest group, and to reduce the body of core values which serve as the touchstone of life. Our generation may be compared to a traveler in a strange land where the crossroads are many and the signposts few. Without an adequate value system, we lose the sense of direction, we are less and less able to make an automatic response to most of the stimuli in the environment. To make the matter worse, the historic carriers of the core values of society—family, church, and community—have become progressively less effective. And to make the matter still worse, technology is forcing the reconstruction of many, if not most, of our historic institutions and creating thereby a further conflict of values.

In the midst of cultural confusion and conflict of values, it is not surprising that youth meet with difficulty and sometimes with defeat and frustration in attempting to orient their behavior in terms of fundamental ethical principles. No greater challenge faces our generation than to place under the feet of youth the feeling of land that is firm. In all the avenues that lead through the depth and breadth of human experience, past and present, youth must be guided in the quest for elements to be woven into a value pattern which will serve as a touchstone to statecraft, as a standard for the evaluation of the structure and operation of the economy, as criteria for passing judgment on all proposals, both public and private.

VII. THE REDIRECTION OF EDUCATION

The foregoing analysis of some of the features of the adolescent's world points toward redirection of education. In a democratic society the school always has the responsibility of transmitting honestly and without prejudice those accumulations of ideas, knowledge, values, and skills which constitute the capital of human experience. The school constantly faces the task of identifying those elements in human experience which are in fact the essential elements of the common culture and of organizing them into a coherent and effective educational program.

But it is not enough for education to be concerned with the re-interpretation and transmission of the culture and the intellectual development of the child; education is also concerned with the development of personality, with the problems of individual adjustment. And if the individual is to make a satisfactory adjustment to his culture,

the school and other educational agencies in the society must provide him with the concrete experiences which will develop in him the values, the motivations, the desires, the sensitivities, and the skills which his society demands of him.

Educational statesmanship in a democracy will scarcely be satisfied with a theory of education that confines the functions of the school to the transmission of the culture, to the development of personality, or to the maintenance of social stability. Over and above these the school has a function to perform as an agency of social direction, as a means of modifying the culture; it has a role to play in social transition. In a democratic society the school will function as a constructive critic of social values and processes. Indeed, it may not be too much to say that for this and the next generation the most important obligation of the American educational system is to prepare youth to pass sound judgment on fundamental matters of public and social policy, to equip them with the values, motivations, intelligence, and knowledge they will need in working out co-operatively the design of a new society.

REFERENCES

1. AMERICAN YOUTH COMMISSION, General Report. *Youth and the Future*. Washington: American Council on Education, 1942.
2. CONANT, JAMES BRYANT. "Education for a Classless Society," *Atlantic Monthly*, CLXV (May, 1940), 593-602.
3. DAVID, PAUL T. *Postwar Youth Employment: A Study in Long-Term Trends*. Washington: American Council on Education, 1943.
4. EDWARDS, NEWTON. "Educational Problems of a Changing Population," *Elementary School Journal*, XXXIX (May, 1939), 664-78.
5. ———. *Equal Educational Opportunity for Youth*. Washington: American Council on Education, 1939.
6. ———. "Population Trends and Problems of Education," *Population Trends and Programs of Social Welfare*, 34-41. Reprinted from *The Milbank Memorial Fund Quarterly*, XVIII, Nos. 3 and 4 (July and October, 1940).
7. ———. "Youth as a Population Element," *Annals of the American Academy of Political and Social Science*, CXCIV (November, 1937), 6-17.
8. ———, editor. *Education in a Democracy*. Chicago: University of Chicago Press, 1941.
9. GOODRICH, CARTER and OTHERS. *Migration and Economic Opportunity*. Philadelphia: University of Pennsylvania Press, 1936.
10. HAUSER, PHILIP M. "Population," *American Journal of Sociology*, XLVII (May, 1942), 816-28.
11. LEVEN, MAURICE; MOULTON, HAROLD G.; and WARBURTON, CLARK. *America's Capacity to Consume*. Washington: Brookings Institution, 1934.

12. LINDEMAN, EDUARD C. "Youth and Leisure," *Annals of the American Academy of Political and Social Science*, CXCV (November, 1937), 59-66.
13. LORIMER, FRANK; WINSTON, ELLEN; and KISER, LOUISE K. *Foundations of American Population Policy*. New York: Harper & Bros., 1940.
14. MELVIN, BRUCE L., and SMITH, ELNA N. *Rural Youth: Their Situation and Prospects*. Works Progress Administration, Division of Social Research, Research Monograph XV. Washington: Government Printing Office, 1938.
15. MYRDAL, GUNNAR. *Population: A Problem for Democracy*. Cambridge, Massachusetts: Harvard University Press, 1940.
16. NATIONAL RESOURCES COMMITTEE. *Consumer Incomes in the United States*. Washington: Government Printing Office, 1938.
17. ———. *Problems of a Changing Population*. Washington: Government Printing Office, 1938.
18. NORTON, T. L. *Public Education and Economic Trends*. Cambridge, Massachusetts: Graduate School of Education, Harvard University, 1939.
19. THOMPSON, WARREN S. "Outstanding Population Trends Affecting Problems of Social Welfare," *Population Trends and Programs of Social Welfare*, 9-17. Reprinted from *The Milbank Memorial Fund Quarterly*, XVIII, Nos. 3 and 4 (July and October, 1940).
20. ———. *Population Problems*. New York: McGraw-Hill Book Co., Inc., 1942.
21. UNITED STATES DEPARTMENT OF AGRICULTURE. *Farm Population Estimates, 1910-1942*. Washington: Bureau of Agricultural Economics, 1942.
22. UNITED STATES DEPARTMENT OF COMMERCE. *Population*, Series P-5, No. 13. Washington: Bureau of the Census, August 23, 1941.
23. UNITED STATES TEMPORARY NATIONAL ECONOMIC COMMITTEE. *Profits, Productive Activities, and New Investment*, Monograph No. 12. Washington: Government Printing Office, 1941.

CHAPTER XI

SOCIALIZATION AND ADOLESCENT PERSONALITY

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Socialization is the life-long process through which the human organism learns a culture, or possibly several cultures. One of the subtypes of socialization is acculturation, which is the learning of a culture different from that of one's birth group. Socialization is not simply the process of learning the specific skills of tool-using, language, and social organization, but implies as well the learning of these cultural behaviors as they are defined by a particular society. During this process of learning cultural behavior, which extends from infancy to death, the human organism likewise must learn to adjust emotionally to the impact of these social controls as presented to him by his parents, older siblings, teachers, employers, and other cultural surrogates. This central characteristic of human social learning, namely, that human beings always learn their social behavior in some type of relation to other personalities, and therefore in an emotional context, is the crucial principle underlying any systematic effort to understand adolescent social and personal development. That is, every adolescent's social behavior bears the marks of his personal history in relation to his parents, his siblings, his play-group, and his teachers, as well as the imprint of the cultural controls.

It is clear, of course, that culture cannot be inherited genetically; none of it can be transmitted by the mere fact of birth into a certain family, social class, or race. All cultural behavior is learned behavior; it must be learned by each new human organism through the laborious processes of imitation, identification, competition, co-operation, and the other methods of social learning. At birth the organism is driven by simple biological tensions, such as hunger and pain, to learn the acts leading to a desired goal response of eating, or of removal of pain. From the time of weaning, however, and increasingly thereafter, he is

taught to react to his biological tensions in socially defined ways. For example, a child in our society is trained to regard only certain meats and plants as edible, that is, as goals for his hunger. He must learn, furthermore, that he cannot eat whenever he wants to (that is, he cannot go to the goal directly by the shortest route), but must accept the alternative response of eating at regularly appointed hours. The intricate sequence of actions which the socialized human being has been taught to substitute for the direct biological responses appears to be simply a longer route to the same biological goals, with lanes and hurdles to teach him that the responses may be obtained only under certain conditions, if he is to win acceptance in a particular group.

The learning of new habits after earliest infancy is always a slow and difficult process of re-education because it involves the changing of old habits. Punishment is one of the most important methods used in our society to extinguish undesired habits and to impel the individual to new behavior. Most individuals, therefore, come to anticipate punishment in new learning situations; socialized anxiety thus appears as a constant mark left upon many individuals by the processes of their socialization. The aim of this chapter is to present evidence for the hypothesis that the successful socialization of the adolescent depends upon the degree of *adaptive*, or socialized, anxiety which has been instilled in him by his society. It is believed that the proper level of such socialized anxiety acts as a necessary push toward the attainment of the required cultural behavior, and through such attainment, to approval, prestige, and security in the adolescent's group.

I. THE SYSTEMS OF SOCIAL RANK

In spite of certain universal similarities (in language, dress, familial structure, and technical adaptations) which appear in our society, the conditions under which persons have access to fundamental biological and social goals are defined by a system of privilege. When this system is examined in detail, as it recently has been studied in New England and in the lower South by social anthropologists who lived in these communities for extended periods, it is found to be a system of socially ranked groups, with varying degrees of social movement existing between them. Each of these groups consists of people who associate or may associate freely with each other, but who do not associate freely with the groups "above" and "below" them.

In our society an individual is born into a family which is a member of such a socially ranked group. His family's economic, social, and sexual participation is largely limited to its own group. He is con-

trolled by his social position, not simply in the formation of his early habits, but throughout his life. He is controlled by the pressure which he receives from groups above and below him to restrict his participation, that is, to "keep him in his [social] place." The effect of such pressure is usually to prevent him from learning new habits, and thus from increasing his privileges. Barriers upon interclass participation thus set up differential reinforcements for each group; the nature of these social reinforcements is ultimately determined by the kind of privileges (goal responses) which the group is allowed to attain.

The systems of social rank which exist in American society differ in degree; that is, they differ with respect to the opportunity allowed an individual living within the system to move into a stratum other than that in which he was born. The most effective ways to restrict intergroup movement in any Western society are (1) to prevent the individual from marrying out of his birth group, and (2) to restrict his opportunities to earn money.

There are three of these broad systems of social rank in our society, each of them tending to restrict the cultural, and therefore the learning, environment of the children in these strata. These cultural systems are those of the (1) *social classes* and (2) the *ethnic or foreign-born groups*, both of which are less sharply stratified than (3) the *color castes*. It is possible at present for a child born into a *social class*, or an *ethnic group* having low status, to move into a "higher" status and a "higher" cultural level by learning the necessary behavior and displaying the necessary symbols. *Color castes* in America, however, allow no status movement at all out of one's birth group. Such status differentiations as these have the effect, in varying degrees, of defining and limiting the developmental environment of the child; if people of different cultures cannot associate freely, they cannot learn one another's special form of the American language, methods of child-rearing, manners, morals, and social and psychological goals.

In this chapter the differential socialization of adolescents in America will be considered chiefly in terms of the differentiated cultures of social classes. These cultures are of chief interest among those of American status groups, because they are found in basically similar form within most ethnic groups and color castes. Native whites who are lower class, and native Negroes, Chinese, or Spanish-Americans who are lower class are much the same in culture and in social psychological instigations. The same crosscutting characteristic of social-class behavior has been observed for middle-class native white and native Negro Americans. Upper-class culture does not exist in the

same form in the white and Negro groups, since there is as yet no Negro aristocracy in the sense that there is a New England or southern white aristocracy. The same reservation has to be made with regard to the foreign-born colonies of European whites in American cities; they have not differentiated a distinctive upper-class culture as yet. On the other hand, the old, native-born Spanish-American and Chinese families constitute an aristocracy with a well-defined culture.

So strong are the class cultures that they tend also to obliterate differences in the national cultures of foreign-born white groups in this country. That is, the prestige value of being (1) an American and (2) a middle-class person is so great that, unlike minorities in Europe, our minority groups tend rapidly to extinguish their foreign-born culture and social motivation and to learn those of that particular American social class in which they can win acceptance.

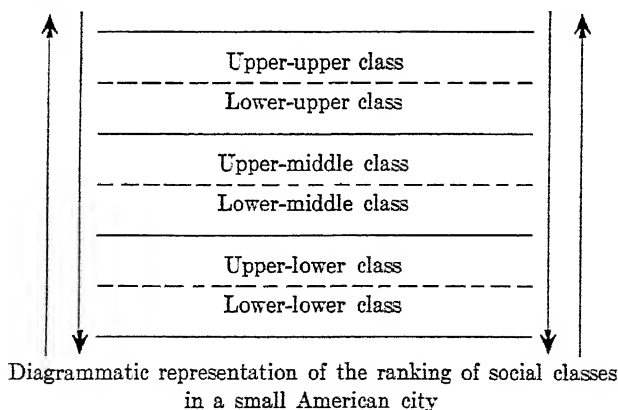
II. SOCIAL CLASSES AS LEARNING ENVIRONMENTS

Intensive field studies of intimate social participation between the inhabitants of small cities in New England, the deep South, and the Midwest have revealed several major levels of participation and culture. These social strata are developed and recognized by the inhabitants upon the basis of types of language, manners, mores, rituals, economic traits, and other differentiated symbols of rank. In the study of intimate social participation, it is found that distinctions of social-class position are always made upon a basis of possible social intimacy, as in the following quotations: "They don't fit in with our bunch." "We don't know her family: I never saw her socially in my life." "They are ordinary people like us; you feel at home with them." "They are the big shots, the society folks." "I wouldn't let my children play with that woman's; they are ignorant, common, dirty people."

An individual's class status is determined by his social clique. He is no higher nor lower in the status scale than his intimate acquaintances. The social clique is a group of individuals who have such intimate relations as are expressed by visiting, eating, and drinking together in the home and by the other rituals of informal social participation. The basis of the social clique is equality of the members in social status and similarity in culture. Intimate social cliques may contain from two to about thirty persons. Social cliques and families are the basic units of a social class. In the family and in his social clique the child learns his class behavior and goals. As a learning environment for children and adolescents who wish to "rise in the world" (attain a higher class position), the social clique is an even more important training context

than the family. His family can teach him only the behavior and motivation of its own class; a social clique of higher status, however, provides him with the necessary models for cultural imitation.

There is no uniform number of social classes in American communities. The number and complexity of social strata vary according to the age and economic complexity of the community and according to the rural, urban, and ethnic composition of the population. In the small cities studied, the number of major classes identified has been three, each having two subclasses. The three major strata are ranked upon the basis of their prestige value in the thinking of the inhabitants of the communities; they may be termed upper, middle, and lower classes. Within each of these major status groups and cultures, there are also an upper and a lower status. Thus, there exists a middle class, differentiated into an upper-middle and a lower-middle class. The accompanying diagram is meant to represent the six cultural strata in such a small city. The arrows pointing upward and downward, in relation to the horizontal strata, indicate that the social class system in this country still allows individuals to improve or to worsen their class position.



The manner in which concepts of appropriate socialization and of personality goals vary according to the status of a given group in the local community has been described recently by social anthropologists and social psychologists. They have used as their principal field-technique the intimate, unguided interview, obtained by an individual who has participated for a long time in the life of the community. Their subjects have included white adults and white adolescents of all the ethnic groups. In addition, they have carried out, with the aid of psychiatrists, intensive studies of the life histories of Negro children and

adolescents. The views presented in this paper concerning the processes of human socialization are largely the results of these studies of American communities, their methods of socializing their members, and the history of these processes in the personality development of specific individuals.¹

Within each of these participation levels, with their cultural environments, a child learns characteristic behavior and values concerning family members, sexual and aggressive acts, work, education, and a career. A child of middle status, that is, acquires different social goals, different needs, different codes of right and wrong, and he experiences different psychological rewards and punishments from those learned by a child of either upper or lower status. These restricted learning environments are maintained by powerful and firmly established taboos upon social participation outside of one's status-level. Such pressures to keep the individual, of whatever ethnic group or social class, in his social "place" are exerted not only by those above him, but also by those below him and by those in his own status. Thus, well-defined cultures are developed and maintained by means of restricted social participation between groups or between individuals of different social status.

III. SOCIALIZATION AND ANXIETY MOTIVATION

The child and adolescent in our society are socialized within a series of personal relationships characterized by rank. These hierarchical relations include, among many others, those between parent or parent-surrogates and child, between teacher and child, and between children themselves, of different ages and sexes. Thus, the early socialization of the American child occurs largely in relationships where he is subordinated upon the hierarchical principles of inferiority in age, skill, or experience. These relationships of rank, whether between father and son, teacher and pupil, middle-class individual and lower-class individual, are maintained apparently by socially typed motivations and goals which lead the individual to strive for those reinforcements which are considered proper to his status. In the normal range of personalities, this striving is maintained, it appears, by adaptive forms of socially inculcated and approved anxiety.

The intensive study of normal personalities leads inevitably to the recognition of the tremendously vital role of this type of socialized anxiety in the integration and direction of the personality, notably in

¹See references 9, 10, 11, 12, 14, 19, 27, 33, 35, 37, 38, 39, 40.

the development of individuals of middle status. One of the certain gains for social science, in the recent studies of normal individuals living in their social contexts, has been the discovery that many concepts of personality economy developed by psychopathology do not hold for individuals in our own culture who are not mentally ill. The tendency of the psychopathologist to extend the concept of the neurotic, nonadaptive, irrational type of anxiety, for example, to all anxiety has been a dangerous generalization. In the same way many other concepts of maladaptive functions, based upon clinical study of the delinquent, the criminal, or the mentally ill have been applied wholesale to the analysis of the personality dynamics of normal people by mental hygienists, psychiatric case-workers, and by other students of personality development. These supposedly symptomatic traits include, among others, such motivations as hostility, guilt feelings, intimidation, inferiority feelings, chronic frustration, as well as anxiety.

The fact is, however, that all of these motivations not only appear in the normal range of human personalities in American society, but these instigations may be all culturally useful and may be integrated in some form into the adaptive behavior of the well-adjusted and socialized child or adolescent. For example, most young children of middle-status families are trained in the basic cultural forms with regard to property, exploration of the adult world, and aggression largely through those feelings of shame, of age inferiority, of guilt, and of anxiety which are instilled by the parents and other adults in accord with the necessary modes of child training *in a society like that of American middle class*. Even aggression and hostility must be taught to the child through culturally approved forms. With regard to overt aggression, the middle-class boy must learn, for example, (1) to fight when attacked by another boy, (2) not to attack a boy unless he has been struck, (3) not to attack girls or supervisory adults under any circumstances, but also (4) not to withdraw when in a normal, approved competitive situation. A child without the culturally approved, adaptive type of aggression in a competitive and status-structured society like ours is himself abnormal.

Equally important to effective socialization in our society is the maintenance by the individual of a certain level of anxiety with regard to the attainment of the required behavior for his status. This socialized anxiety plays a major role in propelling him along that cultural route prescribed by his family, school, and later by adult society at his cultural level. The development of adaptive, socialized anxiety in middle-status life is all the more essential because the social and pres-

tige rewards of this status must necessarily be postponed during the prolonged training of the child and adolescent for high skills and complex responsibilities. In the meantime, anxiety which threatens the individual with the loss of both present status and of future gains must serve as the basic instigation in his socialization.

This view of the essential function of anxiety as a learned motivation in normal social development has evolved slowly (28, 29). Both preconceptions of psychologists and cultural bias against recognition of the actual use of fear and shame in child training have impeded its growth. In 1890 William James and his contemporaries imagined anxiety to be instinctive, biologically useful in most instances, phylogenetically determined, and not learned. Students of the conditioned stimulus also later regarded certain types of anxiety, such as the "fear of loss of support," as innate, but have recently abandoned this view. They now conceive of anxiety as a conditioned response made to stimuli and cues which have been associated with pain. "Anxiety," according to Professor O. H. Mowrer, "is thus to be regarded as a motivating and reinforcing agent similar to hunger, thirst, and the many other forms of discomfort that harass living organisms, which is, however, presumably distinctive in that it is derived from and based upon anticipation of these other, more basic forms of discomfort" (29).

IV. SOCIALIZATION AND THE CULTURAL AND PRIVATE PERSONALITIES

It appears to the writer that, in order to perceive clearly the socially adaptive functions of anxiety, one must distinguish between two major aspects of the human personality. They are (1) the individual or private aspects of personality, and (2) the culturally typed aspects of personality. Much of the apparently hopeless disagreement among students of personality arises from their failure to recognize the fact that one of the two systems of behavior which constitute personality has its origin in cultural demands, while the other has its origin in both the genetic structure of the organism and its individual history. This latter, the private or idiosyncratic personality, is rooted in organic traits such as irritability, growth tempo, fatigue rate, etc., which may differentiate between infants during even the first weeks of life. It is also a function of the emotional adjustments of the individual throughout his whole development; it includes those traits and adjustment devices which *distinguish between men trained in the same culture, but having different histories in the processes of their cultural induction.*

On the other hand, that system of behavior—or thought, perception, affect, and values—which is typed by the culture must be thought of as a second gradient of personality differentiation. This aspect of personality appears as soon as a baby begins to receive training in those nursing, sleeping, and cleanliness habits which are required by *our* society, (but not by *other* societies). In American society the cultural forms which a child must learn are extremely complex and numerous. They begin at birth, and include the basic conventions and taboos of the family, the sex groups, the age groups, the social classes, ethnic cultures, color castes, and so on. Freud and the psychopathologists have, of course, made many grievous errors with regard to the cultural basis of personality, having attributed to either phylogenetic or instinctual origins certain emotional patterns which, as social anthropologists have demonstrated, actually vary tremendously through different societies of the world.

Students of society have themselves confused our studies of personality by accepting the psychological dogma that the private aspects of personality are emotional and irrational, while the cultural aspects are rational, simple, and therefore more superficial. When one studies any given individual in his society, however, it becomes clear that both the private and the cultural motivations are emotionally based. Fear, hate, anger, and anxiety are generated and organized around the social roles required by age, sex, family, and class status just as they are rooted also in hunger, thirst, or sex drives. To illustrate: a child may experience anxiety (i.e., anticipation of punishment or loss of approval) either because he is being required to learn toilet training (a cultural behavior), or because he fears that his baby brother will take his mother's love (a private behavior). It is likely that anyone who observes a child carefully will hesitate to term one of these types of anxious situations more fundamental than another in the child's view. The first source of anxiety—cleanliness training—is systematically instilled by his society in the form of parents, nursemaids, and siblings; it is essential to successful social development in American society, and it remains throughout life. The second form of anxiety, the child's fear of being replaced by the younger sibling, is private and often non-adaptive. Both types of anxiety *may* become abnormal, but the first type always has the initial advantage of being socially approved, and therefore of leading to reduction of guilt and fear, if the training is learned.

What I have called the *private* personality is perceived in that behavior of an individual which distinguishes him from other individuals

socialized in the same culture. For example, one Samoan is not like all others; in his private characteristics he may be much like this or that fellow whom we have met, or fought, or been friendly with in our own parts of American society. Therefore, persons who show relatively little anxiety and who make new adjustments to their bodies or to their cultures easily may be distinguished upon this personal basis from other individuals, of roughly the same social training, who exhibit great difficulty in making new adjustments and experience more severe anxiety. *Although the private personality is in part a result of organic, genetic, and maturational factors, it is in some respects the result of the accumulation of learning and of blocks to learning during the processes of the individual's socialization.* This diversity in adaptive disposition between members of the same culture arises in part also from the differences in method, timing, and emotional environment, incident to the training of these individuals. In this sense and to the extent that personality is affected by these factors, the private personality may be regarded as the more or less constant *individual marks* left upon behavior as it develops in the process of socialization.

With regard to the cultural aspects of personality, it must always be remembered that social roles are extremely complex in American society. For example, the same individual female organism has to learn the social behavior, sentiments, and values proper to a daughter, a sister, a wife, a mother, and a grandmother. In each of these roles she is also required to act differently toward a male relative and a female relative (38, 40). The ease of a personality in achieving such new learning as this depends not only upon the nature of the anxiety motivation, but also upon the degree of similarity between previous cultural experience and the new roles. For example, it would be hopeless for the most adaptable child to play a man's role, or for a lower-class person, except in the dramatist's story, to adjust fully to upper-class preoccupations with genealogies, fox-hunting, and leisure-typed conversation.

V. ADOLESCENT SOCIALIZATION AND NORMAL ANXIETY

In adolescents of any cultural level in our society, socialized anxiety is a powerful drive. It is derived from a long and complex series of training situations in which punishment has been invoked. In all social classes the overwhelming majority of parents depend upon threats, warnings, scoldings, withdrawal of approval, or physical punishment in their efforts to socialize their children. All of these techniques are designed to arouse anxiety or the fear and anticipation of

punishment, if the desired social learning is not attained. Since any of these techniques implies to the child the loss of his parents' favor or approval (which in turn is associated with food, shelter, money, opportunity to study for a profession, etc.), they all arouse in him the anticipation of punishment, if the expected behavior is not learned. As the middle-class child comes into the status of an adolescent, the level of his socially stimulated anxiety becomes higher, for the pressure upon him of his parents, social clique, and teachers for attainment in respect to manners, preparation for work, and cross-sexual restrictions becomes greater. As the adolescent becomes more keenly aware of the need for social acceptance, for a career, and for a "good" marriage, as he sees the goals of his group in sharper perspective, he becomes more amenable to social punishments. He also sees more clearly the goal of *social prestige* in the school and in the social group with which he participates or hopes to participate. In adolescence, the lower-status individual begins to feel the stigmas of lower status much more keenly; children of families which have begun to "fall" in class status see their dilemma more vividly and become more careful to avoid behavior and situations which will reveal their weak status position.

All of the foregoing changes in social behavior and goals at adolescence indicate an increased striving for prestige and are maintained partly by the anxiety to avoid social punishment and partly by the drive to attain the rewards of social prestige. *Anxiety of this type, therefore, is a most effective motivation toward social learning because it leads to reward. In our social system the instrumental acts to attain prestige rewards are acts of striving.* Thus, anxiety is mobilized not only by the anticipation of punishment if the required behavior is not learned, but by the desire not to be deprived of reward. *It is this striving for reward, for status, this uneasiness lest the reward be not attained, which constitutes the adaptive social function of anxiety. Adolescents with a strongly developed social anxiety, therefore, usually strive for the approved social goals most eagerly and learn most successfully.* In this sense the most fully socialized individuals are those with the most effective, socially directed anxiety. This is the characteristic of anxiety as a socializing agent which Freud did not describe. He thought of anxiety in terms of anticipation of danger and punishment, and therefore in terms of fear and hostility. An intensive study of the life histories of normal children and adolescents in our society, however, makes it clear that the behavioral manifestations which teachers and psychologists would regard as "anxious" are associated with striving behavior. Anxiety leads to striving because only

thus can anxiety be reduced to a tolerable level. Thus, it may be said that, in our kind of society, if a child wishes to be rewarded, he must learn to mobilize and bear that degree of anxiety which will serve to make him strive most effectively for the goals of his group.

Lower-class culture, white or Negro, organizes adolescent behavior with regard to aggression, sexual relations, age roles, and family roles, to mention only a few of the basic types of relationships, into patterns which differ radically from those of middle-class adolescents (10, 12). In terms of motivation this means that the culture determines (1) what the goal-responses (the effective reinforcements or rewards of learning) are for a given adolescent and (2) the degree to which the goal-responses are available to him. With regard to a great many goals, what is rewarding to a middle-class adolescent is not at all so to a lower-class adolescent. What they fear, what they abhor, what they desire, what they crave, what they will work for, or fight for, what they consider valuable or sacred differ in almost every basic area of human relationships.

The aggressive behavior of adolescents is a crucial case in point. In middle class, aggression is clothed in the conventional forms of "initiative," or "ambition," or even of "progressiveness," but in lower class it more often appears unabashed as physical attack, or as threats of and encouragement to physical attack. In general, middle-class aggression is taught to adolescents in the form of social and economic skills which will enable them to compete effectively at that level. It may be full of personal hostility and insecurity, or it may be realistic and socially directed. The lower classes not uncommonly teach their children and adolescents to strike out with fist or knife and to be certain to hit first. Both girls and boys at adolescence may curse their father to his face or even attack him with fists, sticks, or axes in free-for-all family encounters. Husbands and wives sometimes stage pitched battles in the home; wives have their husbands arrested, and husbands try to break in or burn down their own homes when locked out. Such fights with fists or weapons, and the whipping of wives occurs sooner or later in many lower-class families. They may not appear today, nor tomorrow, but they *will* appear if the observer remains long enough to see them.

The important consideration with regard to aggression in lower-class adolescents is that it is learned as an *approved and socially rewarded* form of behavior in their culture. An interviewer recently observed two nursery-school boys from lower-class families; they were boasting about the length of their father's clasp-knives! The parents

themselves have taught their children to fight not only children of either sex, but also adults who "make trouble" for them. If the child or adolescent cannot whip a grown opponent, the mother or father will join the fight. In such lower-class groups, an adolescent who does not try to be a good fighter will not receive the approval of the father, nor will he be acceptable to his play group or gang. The result of these cultural sanctions is that he learns to fight and to admire fighters. The conception that aggression and "hostility" are neurotic or maladaptive symptoms of a chronically frustrated adolescent is an ethnocentric view of middle-class individuals. In lower-class families in many areas, physical aggression is as much a normal, socially approved and inculcated type of behavior, as it is in frontier communities and in war.

There are many forms of aggression, of course, which are disapproved by lower-class as well as by middle-class adolescents. These include, among others, attack by magic or poison, rape, and cutting a woman in the face. Yet all of these forms of aggression are fairly common in some lower-class areas. Stealing is another form of aggression which lower-class parents verbally forbid, but which some of them in fact allow—so long as their child does not steal from his family or its close friends. The example of the adolescent's play group and of his own kin, however, is the crucial determinant of his behavior. Even where the efforts of the parent to instill middle-class mores in the child are more than half-hearted, the power of the street culture in which the child and adolescent are trained overwhelms the parental verbal instruction. The rewards of gang prestige, freedom of movement, and property gain all seem to be on the side of the street culture.

Like physical aggression, sexual relationships and motivation are far more direct and uninhibited in lower-class adolescents. The most striking departure from the usual middle-class motivation is that, in much lower-class life, sexual drives and behavior in children are not regarded as inherently taboo and evil.

There are many parents in low-status cultures, of course, who taboo these behaviors for their girls. Mothers try to prevent daughters from having children before they are married, but the example of the girl's own family is often to the contrary. At an early age the child learns of common-law marriages, and extramarital relationships by men and women in his own family. He sees his father disappear to live with other women, or he sees other men visit his mother or married sisters. Although none of his siblings may be illegitimate, the chances are very high that sooner or later his father and mother will accuse each other

of having illegitimate children; or that at least one of his brothers or sisters will have a child outside of marriage. His play group, girls and boys, discuss sexual relations frankly at the age of eleven or twelve, and he gains status with them by beginning intercourse early. With sex, as with aggression, therefore, the instigations and goal-responses of adolescents who live in these different cultures are opposites. *The middle-class adolescent is punished for physical aggression and for physical sexual relations; the lower-class adolescent is frequently rewarded, both socially and organically, for these same behaviors. The degree of anxiety, guilt, or frustration attached to these behaviors, therefore, is entirely different in the two cases. One might go so far as to say that in the case of middle-class adolescents such anxiety and guilt, with regard to physical aggression and sexual intercourse, are proof of their normal socialization in their culture. In lower-class adolescents in certain environments, they are evidence of revolt against their own class culture, and therefore of incipient personality difficulties.*

The point which these considerations seems to make clear, and which seems borne out by many detailed life-histories of adolescents of each class, is as follows. The social reality of individuals differs in the most fundamental respects according to their status and culture. The individuals of different class cultures are reacting to different situations. If they are realistic in their responses to these situations, their drives and goals will be different. This basic principle of comparative psychology implies that in order to decide whether an individual in American society is normal or neurotic, one must know his social class—and likewise his ethnic culture. His social reality and, therefore, all his social drives, goals, and values, are determined by his culture. He may be quite poorly oriented with regard to middle-class culture, simply because he has not been trained in it and, therefore, does not respond to its situations. If his behavior is normal for lower-class culture—which clinicians, teachers, and guidance workers do not usually know—he may appear to them to be “maladjusted,” “unmotivated,” “unsocialized,” or even neurotic. In dealing with such cases, the reference points of social reality of the teacher or psychologist must be oriented with regard to the basic demands of lower-class culture upon its members.

VI. STRENGTH OF ANXIETY MOTIVATION IN MIDDLE-CLASS ADOLESCENTS

As Warner and Lunt (40) have shown by very detailed studies of behavior in Yankee City, New England, and the Gardners (11) by

careful analysis of family mores and child training in the deep South, middle-class people maintain, organize, and direct American life. The "small people" in the middle group are the backbone of our society; the "upper middles" are the brain and the eyes of the society. Almost all of the good things in American life, as we in education evaluate it, are the achievements of the middle-status persons: care of and pride in property, careful child-training with emphasis upon renunciation and sacrifice for future gains, long and arduous education, development of complex and demanding skills, working and learning one's way up in the complex processes of business, industry, government, church, and education—all of them administered, as Warner, Lunt, and the Gardners have shown, by the upper-middle class in the American status system.

The culture of the middle-status group, as analyzed by these observers, is found to be highly institutionalized; the church, the organizations, the school, the formal associations of all types are the basic integrating structures in their society. Along with this highly organized structure goes a marked emphasis upon *attaining*. As compared to both the lower- and the higher-status levels, then, the middle group is more highly organized and its members are more deeply motivated—by all institutions in middle-class—to *achieve*.

This cultural emphasis upon achievement arises largely from social insecurity: in lower-middle groups it arises largely from the fear of loss of occupation or respectability, which would plunge the family into lower-class life; in upper-middle groups, from the fact that, unlike upper-class people, upper-middles are *not born to* a secure status, but must achieve it in the face of social stigmas and punishment, if it is to be theirs.

The middle-status way, then, with its emphasis upon respectability and morality, upon property, money and other symbols of attainment, upon organizational ties which dramatize one's adherence to group goals, upon self-improvement through education, or book clubs, or art and music clubs, and upon community improvement through the church, the civic organizations, and the school, this way of life which is so obnoxious to Bohemians, aristocrats and slum dwellers, is carried on by people who are culturally motivated to suffer, to renounce, to postpone gratifications in order to achieve. To propel the child along this apparently endless route of socialization—so that he may attain a physician's skills, let us say—the middle-status family uses pressures and goals which build anxiety. The child is taught by a well-defined and relatively severe training to strive for the expected or allowed

age, sex, or class status, or to attempt to gain a higher age, or school, or social-class status. As Dr. and Mrs. Gardner observed in Old City in the deep South, white children of middle-status families are constantly being required by their parents to conform to the elaborate pattern of behavior which their culture demands. Even at the infant level, before the age of two years, persistent punishment, or disapproval, or other means of arousing shame, guilt, or anxiety are employed systematically to establish weaning and cleanliness, and respect for adults and for property. In adolescence the middle-class (especially the upper-middle class) white child was guided, controlled, supervised by his parents, the Gardners found, with regard to the following behavior: the time and etiquette of eating, use of the house and car, attendance at church or Sunday school, selection of his social clique, entertainment of his clique at home, economic matters, attendance at motion pictures and sometimes the pictures to be seen, school lessons, grades, and deportment, together with many other areas of control to which adolescents of the lowest status are not subject in their family relationships. As the child goes through adolescence, furthermore, he is gradually inducted by parents, teachers, and age-mates into the adult pattern of class behavior. Near the end of high school or at the beginning of his college career, he is urged to begin serious study and preparation for an occupation which will maintain the family's status or improve it. A girl is oriented toward either a "decent," "good," or "brilliant" marriage or a skilled or professional occupation.

In any case it seems clear that the sustained striving, the difficult habits of impulse control and organic deprivation which these long educational and socializing processes require (such as the loss of sleep, relaxation, and perhaps adequate food upon the part of the graduate or medical student who is largely dependent upon his own earnings), this striving is motivated by the adaptive anxiety established by the individual's previous family, school, and status relationships. To win the mother's approval or the teacher's praise, or to win prestige in the larger society, the individual is willing to bear a certain level of anxiety, which instigates him to strive for the prestige or the approval relationship. *With regard to upward status-mobility, in the sense of climbing the "democratic ladder," furthermore, this anxiety motivation is entirely realistic and rational in our kind of a society. It is experienced both as an urge to flee from the deprivations of low status and as a pull toward the greater biological and social security of high-status persons.*

In order to understand the prestige motivation of individuals of

middle status, then, one must remember the severe social and biological punishments associated with low status. The anxiety which middle-status people learn is effective, first because it involves the threat of loss of present status, and secondly because it leads, as the individual may plainly see in "successful" persons, to the rewards of power, of social prestige, and of security for one's children.

Now, it is a difficult task to socialize in the middle-class way of behavior those great masses of low-status children who form the bulk of the schools' populations. Yet this is what American public education really attempts. We must learn, therefore, how to motivate low-status children and adults, bound by their own many-sided culture in the family, church, and organizations, by means of socially adaptive forms of anxiety. In order, however, to make low-status children *anxious* to work hard, study hard, save their money and accept stricter sex mores, our society must convince them of the *reality* of the *rewards* at the end of the anxiety-laden climb. To the upper-middle-class child, who learns well and climbs fast, the prestige rewards appear large, certain, and relatively near. Our society cannot hope, therefore, to educate the great masses of lower-class people in any really effective manner until it has *real* rewards to offer them for learning the necessary anxiety.

REFERENCES

1. AICHORN, AUGUST. *Wayward Youth*. New York: Viking Press. 1935. Pp. xiii + 236.
2. ALPERT, AUGUSTA. "The Latency Period (Re-examination in an Educational Setting)," *American Journal of Orthopsychiatry*, XI (January, 1941), 126-32.
3. ANDERSON, JOHN E. *The Young Child in the Home*. Report of the Commission on the Infant and Preschool Child. White House Conference on Child Health and Protection. New York: D. Appleton-Century Co., 1936.
4. BENEDICT, RUTH. "Continuities and Discontinuities in Cultural Conditioning," *Psychiatry*, I (May, 1938), 161-67.
5. BLOS, PETER. *The Adolescent Personality*. New York: D. Appleton-Century Co., 1941. Pp. xiii + 517.
6. BÜHLER, CHARLOTTE. "The Social Behavior of Children," *Handbook of Child Psychology*, pp. 374-416. (Edited by Carl Murchison.) Worcester, Massachusetts: Clark University Press, 1933.
7. CAMERON, W. JAFFRAY. "A Study of Early Adolescent Personality," *Progressive Education*, XV (November, 1938), 553-63.
8. CAMPBELL, ELISE H. *The Social-Sex Development of Children*. Genetic Psychology Monographs, Vol. XXI, No. 4. Provincetown, Massachusetts: Journal Press, 1939.

9. DAVIS, ALLISON. "American Status Systems and the Socialization of the Child," *American Sociological Review*, VI (July, 1941), 345-54.
10. DAVIS, ALLISON, and DOLLARD, JOHN. *Children of Bondage*. Washington: American Council on Education, 1940. Pp. xviii + 299.
11. DAVIS, ALLISON; GARDNER, BURLEIGH B.; and GARDNER, MARY R. *Deep South*. (Chapters on "The White Upper-class Family," "The White Middle-class Family," "The White Lower-class Family.") Chicago: University of Chicago Press, 1941. Pp. xv + 558.
12. DOLLARD, JOHN. *Caste and Class in a Southern Town*. New Haven, Connecticut: Yale University Press, 1937. Pp. 502.
13. ———. "Culture, Society, Impulse, and Socialization," *American Journal of Sociology*, XLV (July, 1939), 50-63.
14. DOLLARD, JOHN, and OTHERS. *Frustration and Aggression*. (Chapters on "Socialization in America" and "Adolescence.") New Haven, Connecticut: Yale University Press, 1939. Pp. viii + 209.
15. ERIKSON, ERIK HOMBERGER. "Observations on Sioux Education," *Journal of Psychology*, VII (1939), 101-56.
16. FREUD, SIGMUND. *Three Contributions to the Theory of Sex*. Nervous and Mental Diseases Monograph Series, No. 7. New York: Nervous and Mental Disease Publishing Co., 1930. Pp. xiv + 104.
17. ———. *The Problem of Anxiety*. (Tr. by H. A. Bunker.) New York: W. W. Norton & Co., Inc., 1936. Pp. vii + 165.
18. FURFEY, PAUL H. "The Group Life of the Adolescent," *Journal of Educational Sociology*, XIV (December, 1940), 195-204.
19. GARDNER, BURLEIGH B.; GARDNER, MARY R.; and LOEB, MARTIN B. "Social Status and Education in a Southern Community," *School Review*, L (March, 1942), 179-91.
20. HAVIGHURST, ROBERT J.; PRESCOTT, DANIEL A.; and REDL, FRITZ. "Scientific Study of Developing Boys and Girls Has Set Up Guideposts," *General Education in the American High School*, pp. 105-35. Chicago: Scott, Foresman & Co., 1942.
21. HAVIGHURST, ROBERT J., and DAVIS, ALLISON. "Child Socialization and the School," *The War, Education, and Society*, pp. 29-37. Review of Educational Research, Vol. XIII, No. 1. Washington: American Educational Research Association, 1943.
22. KARDINER, ABRAM. *The Individual and his Society*. New York: Columbia University Press, 1939. Pp. xxvi + 503.
23. LUMPKIN, K. D., and DOUGLAS, D. W. *Child Workers in America*. New York: Robert M. McBride & Co., 1937. Pp. xii + 321.
24. MEAD, MARGARET. *From the South Seas*. New York: William Morrow & Co., 1939.
25. ———. "The Primitive Child," *Handbook of Child Psychology*, pp. 909-26. (Edited by Carl Murchison.) Worcester, Massachusetts: Clark University Press, 1933.

26. MILES, CATHERINE C. "Sex in Social Psychology," *Handbook of Social Psychology*, pp. 683-797. (Edited by Carl Murchison.) Worcester, Massachusetts: Clark University Press, 1933.
27. MILLER, NEAL A., and DOLLARD, JOHN. *Social Learning and Imitation*. New Haven, Connecticut: Yale University Press, 1941. Pp. xiv + 341.
28. MOWRER, O. H. "Anxiety Reduction and Learning," *Journal of Experimental Psychology*, XXVII (November, 1940), 497-516.
29. ———. "A Stimulus-Response Analysis of Anxiety and Its Role as a Reinforcing Agent," *Psychological Review* XLVI (November, 1939), 553-65.
30. MURPHY, GARDNER; MURPHY, LOIS BARCLAY; and NEWCOMB, THEODORE M. *Experimental Social Psychology*. New York: Harper & Bros., 1937. Pp. xi + 1121.
31. PETTIT, GEORGE A. *Primitive Education in North America: Its Processes and Effects*. Unpublished Doctor's Dissertation, University of California, 1940.
32. PRESCOTT, DANIEL A. *Emotion and the Educative Process*. Washington: American Council on Education, 1938. Pp. xviii + 323.
33. SHAW, CLIFFORD R.; MCKAY, HENRY D.; and McDONALD, JAMES F. *Brothers in Crime*. Chicago: University of Chicago Press, 1938. Pp. xv + 364.
34. SIMMEL, GEORGE. "Superiority and Subordination as Subject Matter of Sociology," *American Journal of Sociology*, II (September, 1896), 167-89; November, 1896), 392-415.
35. STOLZ, HERBERT R.; JONES, MARY C.; and CHAFFEY, JUDITH. "The Junior High School Age," *University High School Journal*, XV (January, 1937), 63-72.
36. SYMONDS, P. M. "Some Basic Concepts in Parent-Child Relationships," *American Journal of Psychology*, L (1937), 195-206.
37. TRYON, CAROLINE M. *Evaluations of Adolescent Personality by Adolescents*. Monographs of the Society for Research in Child Development, Vol. IV. Washington: National Research Council, 1939.
38. WARNER, W. L. "The Society, the Individual and His Mental Disorders," *American Journal of Psychiatry*, XLIV (1937), 275-84.
39. WARNER, W. L.; JUNKER, B. H.; and ADAMS, W. A. *Color and Human Nature*. Washington: American Council on Education, 1941. Pp. xv + 301.
40. WARNER, W. L., and LUNT, P. S. *The Social Life of a Modern Community*. New Haven: Yale University Press, 1942. Pp. xx + 460.
41. ———. *The Status System of a Modern Community*. New Haven: Yale University Press, 1942. Pp. xx + 246.
42. WHITING, J. W. M. *Becoming a Kwoma*. New Haven, Connecticut: Yale University Press, 1941. Pp. xix + 226.

CHAPTER XII

THE ADOLESCENT PEER CULTURE

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I. GENERAL CHARACTERISTICS

We have a tendency to disregard or to minimize the educational significance of the child's experiences in his peer group. During the preschool period children begin to seek the company of their own kind and as the years go by more and more of their spare time, and even time that is presumed to be dedicated to adult-planned activities, is given over to playing with, visiting with, being with, "fooling around with" their age-mates. Depending upon their own preoccupations and life purposes, adults look at these behaviors in various ways; some with relief at having the children out of the way, some with annoyance at evidences of "wasted time" and of apparent irresponsibility. Others, perhaps with a more benevolent attitude toward their own childhood and adolescence, remark that play is good for the children, let them be happy while they can.

If we were to examine the major developmental tasks which confront boys and girls in late childhood, during pubescence, and later adolescence, it would become apparent that many of these can only reach a satisfactory solution by boys and girls through the medium of their peer group. It is in this group that *by doing* they learn about the social processes of our culture. They clarify their sex roles by acting and being responded to, they learn competition, co-operation, social skills, values, and purposes by sharing the common life. Unlike the adult-controlled training institutions and agencies of our society the peer group does not regard itself as a training unit. However,

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recent cumulative studies on the adolescent period indicate that mastery of certain developmental tasks at each stage in this period makes for readiness to take the next developmental task in stride. Most boys and girls work at these problems more or less continuously during adolescence, usually with great tenacity and often with great intensity. Usually they but vaguely realize the scope of the learning task which they have set for themselves and its importance for their ultimate maturity. If these tasks are not accomplished successfully, the outcome may be a lack of readiness not only for further development in this area but also for the tasks which other institutions and agencies, such as the school, impose.

The very fact that boys and girls work at their developmental problems so intensely often brings them into conflict with the purposes and objectives which adults have set up (17).

The following anecdote (28) about an adolescent boy in a Swiss school highlights this latter type of conflict.

Erwin Fischer is in his last school year, is clever, strong, and possessed of mother wit. That such a boy is not very careful with his clothing, and sometimes comes to school with dirty knickers or a torn coat, is nothing unusual. It is more unusual that, recently, Erwin has had careful consideration for all his exterior, has gone around brushed, with whole and clean clothing, with an "aviator" haircut, and gently serious expression of countenance. He has taken part in boys' games less than usual—and then in order to show superiority, endurance, and courage—and in the arithmetic hour was discovered observing himself complacently in a little mirror. One day, before he left the room after dismissal, I surprised him bringing his "mane" into order with a tiny comb. During another arithmetic lesson he drew out a small hand brush and cleaned a spot from his vest.

It also seems to me that lately Erwin calculates not less industriously but less well than I had been accustomed to expect from him. "Perhaps you deceive yourself" I think, "are prejudiced because you have twice discovered the lad about other business." And I propose to myself to observe further, and be silent in the interim.

Then he related to me during an outing something which he himself regarded as notable. A few days ago, in a food shop, he had been unable to add one franc fifty and two francs seventy-five; it seemed to him that on the whole he could not calculate as well lately as he formerly could.

"It happened in a Konsum Store,* you say?"

"Yes—the salesgirl was serving Anna Hess [a pupil of the same age]. The girl said to Anna, 'One franc fifty and two francs seventy-five, that makes . . . ?' Anna was not quite sure, then the salesgirl said, 'Tell her, Erwin!' But for the moment I could not think of it either, and the people

* A co-operative food store.

in the store laughed about it. We were both ashamed . . . I didn't used to be bad at arithmetic!"

I know Anna, who came to school to me four years ago when I still taught the intermediate class. She was poor at number work. Not long ago my colleague had complained to me about her weak performances in arithmetic.

"Anna Hess?" I said slowly and observed the boy closely. The blood mounted to his hair. I smiled politely. "What can you tell me of her?"

"You see—" he brought out, and observed sharply my expression. Then he looked around. His comrades were shouting and chatting outside. Behind us came a group of girls. "Anna is—" again he faltered.

"Anna is?"

"You see, she is my sweetheart!"

I suppress a smile, so that the boy shall not misunderstand. Why the boy had been unable to do the sum in the shop, why as a whole he reckoned much less zealously and well, upon all this a light had now been thrown. How tenderly he spared the weakness of his beloved! Wonderful! Something in this wise ran the meaning of his behavior. "My Anna need not be ashamed because she could not immediately do it either." Or: "If Anna does not calculate well, then I must not shame her by calculating well."

I share my conclusions with the boy, and tell him that I have also noticed his slackening in matters pertaining to arithmetic. Then we speak for a while about his love. I am glad to have an insight into the pure and harmless relationship, especially as Erwin assures me he will never like another girl so much, and under no circumstances marry anyone else. And lately, on account of the girl, he thinks highly of himself also perhaps, and sees to it that he does not go around "looking like a gawk." When he finishes school he will apprentice himself to a mechanic that he may become an excellent workman, who "earns something." "Then we can get married!"

"In that case you should be able to do sums correctly, don't you think? And because Anna is not so good at sums—which isn't important as she no doubt makes up for it in cooking and sewing—you should make good Anna's defect, for you can do the reckoning for both. In marriage one must complement the other!"

That was very clear to him.

Now he does his sums with a zeal which sometimes makes me repress a smile when I pass by his desk or when my glance grazes his.

Erwin was fortunate in having a wise and sympathetic adult counselor to help him integrate the requirements and expectancies of the school program with the new vision he had of his own sex role. Erwin had worked hard and successfully at some of the developmental tasks of adolescence; further, he was working on them continuously, not just in his "free" time, but in the classroom, at home, in the store. Like many adolescents, his reasons for resisting the adult-imposed

task (in this case arithmetic) were hidden even from himself. Other important tasks of this developmental stage, such as preparing for a vocation in life and identifying with adult roles in the community, were endangered by his unconscious effort to minimize an academic skill, which seemed capable of interfering with personal relationships involved in establishing his heterosexuality. So often such dilemmas as this one of Erwin's are classified by adults as laziness, stubbornness, or irresponsibility, and the opportunity to resolve them, therefore, is further blocked off.

In our society it is probably safe to say that wherever children or youth are together for any length of time and free to pursue their own purposes, there will be a subculture operating (11). As yet we know all too little about these children's societies. There have been only a few studies which have sought to describe the social processes of children's groups, with an analysis of their spontaneous activities and organizations and of the dynamic play of forces within each group. Part of this neglect is due to the fact that we have only recently begun to realize the importance, for the development of the individual, of the subadult social groupings. Further, children and youth in groups tend to throw up barriers to exclude adults and to protect themselves from the interferences and coercions that adults are prone to use. There are also difficulties, characteristic of the study of any group, which reside essentially in the complexity of the problem. However, we know enough about children's groups and societies at the present time to say that such groups have many of the same general characteristics as adult societies, that is, they have group purposes, standards or values, and rules of behavior; some of these are explicit but more often are implicit, though widely accepted and understood. Such groups also have methods of securing conformity. These latter include most of the methods used in American society by adults to secure the conformity of children and adolescents to adult expectations and pressures.

We know further that even though the individuals in any such groups remain constant or fairly constant over a long period of time many changes take place in the fundamental characteristics of the group. The group's behavior, its objectives, its standards or values, its rules of behavior and methods of securing conformity, its relation to the adult society all undergo change as development progresses from late childhood to maturity. In the following pages we shall be concerned with these changes and with the developmental tasks which these changes pose for the individual boy or girl growing up.

II. CHANGING BEHAVIOR

First, let us look at what children are like at the end of the so-called "childhood period." For some, particularly a few girls, this may be as early as eight years of age. For others, usually a few boys, this may be as late as fourteen years of age. For the majority of girls, however, it would be at ages nine or ten, and for most boys at ages eleven or twelve. If we observe spontaneous play groups in action during this period we find that for the most part there is voluntary segregation by sex in our society. Boys and girls seldom play together. Many of the games and play patterns are assigned to one sex or the other. For example, girls jump rope and play hopscotch; boys shoot marbles and play football. Even those games and play patterns which are common to both sexes such as hide-and-go-seek and tag games are usually played by each sex alone. Occasionally, however, a girl joins in the boys' play. To do this she takes on much of the characteristic boy pattern of behavior, language, and even appearance. She is the tomboy and usually is accepted, even mildly approved by boys and adults; girls usually do not reject her. It is much more rare to find a solitary boy participating in girls' group activities (5), since such participation is usually subject to ridicule. To what extent our cultural processes are responsible for the segregation into sex groups it is impossible to tell at this time. Certainly from infancy on, each child is urged into a pattern of behavior which adults have in mind as the appropriate way for boys or for girls to behave. Some of this urging is obvious and overt; much of it involves unconscious manipulation. Further, there is a good deal of adult direction that guides children into their own sex group. Many schools have separate playgrounds and entrances for boys and girls. In the classrooms the teachers direct the boys to do this, the girls to do that. On the playground directors teach one kind of skill to girls, another to the boys. There is usually an adult around to help the boy group point out to any nonconforming boy that certain things are sissy. Whether or not we contribute extensively as adults to the setting up of the barriers between boys and girls may seem an insignificant question if we are concerned only with children at this stage of development. If we are oriented toward the progression of development, however, it becomes very significant, since one of the fundamental and important next problems of development is that of working out heterosexual relationships.

There are distinctive differences between boys and girls other than

in the kinds of things they do at this late childhood stage. If we observe groups who are in late childhood we usually find the boys playing much more vigorously, expending more energy. By and large boys seem more concerned than girls with the achievement of physical skills.¹ Their games have a more intense quality. They are noisier, more disheveled, and often dirty as compared to the girls. Girls seem more inclined to play in smaller groups. Boys travel greater distances from the home block or yard. Anger, hostility, and aggression find different expression in the two groups. Boys of all classes of society are much more inclined to engage in fist fights or threats of physical punishment. They use these methods to a large extent in producing conformity to the group pattern, though they also use approval and admiration. Girls are more inclined to use techniques of exclusion, often verbal, in order to achieve group conformity and to express their feelings of aggression; physical aggression, however, is sometimes found among girls, especially as one descends the social-class scale.

The transition from childhood into the pubescent cycle is often marked first by exaggeration of many of these characteristics of late childhood. The rather unconscious indifference to the other sex, in the latter period, gives way temporarily to elaborate disapproval of the other sex. One group of boys that was studied extensively (24) spoke of the girls at this stage as the "sissies," expressing resentment that they must use the same dressing rooms and other facilities that the girls had used the day before. Similarly the girls regarded the boys with exaggerated disdain or cold disapproval.

Probably at this time both sexes are misplacing on each other some resentment that rightfully should fall on adults. Since we have chosen to classify together in our classrooms boys and girls of very different developmental ages, girls in this transition period of pubescence are, on the average, about two years more mature than the boys physically (20). (See chap. ii.)

Though the pubescent growth cycle lasts from four to seven years it has been pointed out in chapter ii that there is a period of from one and one-half to three years, in the middle of the cycle, in which growth is markedly accelerated. Secondary sex characteristics become obvious and changes in bodily proportions are often startling at this time. It is towards the end of this accelerated growth period that menarche occurs in girls and sexual maturity is achieved in boys. For the majority of girls this period of development occurs at ages between eleven and fourteen years; for the majority of boys this period

¹See chap. vi.

falls between thirteen and sixteen years (20, 22). Observations indicate that corresponding to this period of physical change there are radical changes in social behavior and in attitudes toward self. Various names have been applied to this period of adolescence, such as the "excited phase," or the "impossible stage," again depending on the attitude of the particular adult. Girls become preoccupied with their appearance. They may spend hours daily on their persons, experimenting with hair arrangements, lipstick and rouge, eyebrow plucking. The resulting appearance is often shocking to adults who frequently express reproof. This may be met with outraged rebellious response, particularly if other girls judge the result as "marvelous." Boys, too, become concerned about their appearance. They begin carrying combs around in their pockets and frequently smooth their hair. The end result of thought and effort can be seen in the neatness of their clothes and polished shoes. Erwin, the Swiss boy in the anecdotal record quoted above, typifies a change, with regard to interest in appearance, that is characteristic of boys in California, Ohio, and New York, and probably any other part of Western culture. Erwin, apparently, was one of the early maturers, because the teacher was surprised that he had such "consideration for his exterior." Most of the boys in Erwin's group were still appearing in "dirty knickers, torn clothes." Erwin also is similar to American adolescents who have been studied in that he began to "take part in boys' games less than usual, and then in order to show superiority, endurance, and courage." Grooming is only a part of the boy's concern with his appearance at this time. He is also concerned about his strength, skill, and size (4, 21, 23). The apparent egocentric interest in their own persons, shown by boys and girls at this stage, indicates that they are working on one of the most important developmental tasks, that of accepting the reality of their own appearance; in this process they are trying to make that reality as attractive as possible. Not all boys and girls succeed in mastering this developmental task. This is evidenced, in anyone's experience, by individuals in adult life who continually struggle with their appearance or in one way or another try to compensate for real or imagined defects.

Probably at no time during the life span for most individuals is there such great striving for conformity to the group pattern as there is in this middle phase of adolescence. Efforts are all directed at appearing like, behaving like, doing what the group does. In this sense it is the most conservative of all ages. Curiously enough there is the concomitant urge to be unique, to achieve individuality or "separate-

ness," but this is within the very narrow frame of the group's pattern. The girl tries, for example, to excel in achieving the ideal appearance. Adult standards of behavior do not matter. In many ways adults are something of a problem: their purposes and demands continually interfere with the main business at hand. This is the period of greatest resistance to adults. In their resisting and rebelling the boy and girl are working at another important developmental task of this stage, that of achieving independence of adults, of shedding the childlike attitudes toward adult authority and becoming themselves adults. On many issues the highest authority resides in the peer group which becomes a bulwark of strength in combating adult authority.

Thus far we have considered behavior characteristic of the majority. As has been seen, however, in chapter v, cases of atypical physiological maturing may present special problems of social adjustment. Out of one hundred boys studied by Stolz there were ten who were two or more years retarded in "appropriate male structural and functional characteristics" (21, 22). Also there were seven in this group of a hundred boys "whose structural characteristics showed not only retardation in the development of maleness but an actual tendency toward the normal female pattern." Retarded physical development and atypical sexual development in nearly every case placed the boys at serious disadvantage socially and created for them more or less severe emotional problems. If we add to this group those boys who, for one reason or another unique to each life history, are unable to attack or master the problems of this period, we have a sizeable number confronted by developmental tasks which seem enormously complicated. In their lack of readiness for appropriate steps in maturing, boys and girls find themselves a bit "queer," and out of rapport with the group at a time when conformity to the group pattern is most important for success.

Often these atypical boys and girls start working on these particular social-sexual problems long after the majority of their peers have solved them. Once more they appear queer as evaluated in peer-culture terms. Without the group support they continue to be found wanting as the group attacks next steps in the maturational process. In adult life many of them continue to work at these problems, in an even more ineffectual and perhaps distorted fashion.

Those boys and girls who successfully thread their way through the problems of the earlier stages of adolescence find themselves seeking a new pattern of social life. Appearance is no longer one continuous experiment. It is now accepted, and keeping one's self as presentable

as possible becomes routine. Discrimination takes precedence over the slavish conformity of an earlier period. This capacity for discrimination shows itself in many directions. A boy chooses a girl or a girl accepts the attentions of a boy not just because she is a girl or he a boy but because that particular person has certain special qualities or characteristics. These boys and girls are in this way approaching a new developmental task, which is to explore the possibility of a future mate. Discrimination also shows itself in interests and activities. Interest in school work often increases as the adolescent faces the prospect of his future career, his role in society. Erwin, at the time the observations in the above anecdote were made, was beginning to attack some of the developmental tasks of this later stage of adolescence. The understanding counsel of his teacher helped him to clarify other tasks and bring them all into appropriate perspective to each other.

III. CHANGING VALUE SYSTEMS—BASES FOR STATUS IN THE PEER GROUP

As children progress from early childhood through later childhood and into pubescence the adults who deal with them seem to show diminishing insight into the role or position of any particular child in the group. Moreno (14), for example, asked children from kindergarten through the eighth grade to choose two classmates whom they would like to have sit on either side of them. At the same time he asked the teachers to judge which children would receive many choices and which would receive few or no choices. Teachers' judgments were approximately 65 per cent accurate, in the sense of coinciding with the children's choices at the kindergarten and first-grade level. There was a steady decline in the teachers' agreement with the children as grade level increased. At the seventh grade the teachers were 25 per cent accurate. Other studies of social relationships in classroom groups reveal a similar lack of knowledge about the social structure on the part of teachers of age groups in later childhood and adolescence. Often a teacher is completely surprised or shocked to learn the facts about the social role of certain individuals. For example, Elliott (7) reports as typical of other teachers the comment of one classroom teacher after she had seen the result of a sociometric test on her group. "At first I couldn't believe that Ray had no friends. I would have said that he is very popular. After observing the class for a while I discovered that the facts shown by the friendship chart are correct. I misjudged Ray because he is always so friendly with me and goes out

of his way to do nice things for me. I like him but the other children don't pay any attention to him."

There are probably many factors which contribute to this decreasing knowledge and understanding. One significant factor is that children, as they grow up, evolve their own standards or social values by which they guide their conduct and evaluate their behavior. This is not to say that the children's value patterns do not reflect in some fashion those of the adult society which frames the particular child group. Certainly a lower-class group of children would be more like a lower-class group of adults than they would be like a middle-class group of adults. And any American group of children would probably be more similar to any American group of adults than to adults in, for example, a Samoan society. But, if we were to examine the pattern of values of any group of children we would see that they were in many respects distinctly different from those of the grown-ups about them. In all probability their social patterns are only partly learned from adults. As far as we know now they emerge to a large extent out of the needs of the group and through imitation of and initiation by members of the next older developmental level (11).

These value patterns do not remain fixed, rigid, final, during the continued functioning of any particular group. They change apparently concomitantly with the changing behavior which was sketched above. It is no wonder then that teachers and other adults fail so often to grasp the nature of the dynamic social patterns of the children's group. The teacher and the research worker, too, are operating on their own value systems, which usually makes it difficult if not next to impossible to move into that objective position which is necessary to recognize and appreciate another value system. Further, the very fact that children's values change as they progress through the growth period may impress the casual observer as evidence that the child's standards and purposes which he derives from the group are not very stable, not very important. It is with regard to these changes that adults often fail the child most seriously. They do not see that the child has the task of making the changed values his own, of readjusting his behavior to meet the new standards, and of accepting a new image of himself as it emerges through these changes.

Only a few studies are available to shed light on the important questions concerned with children's and youth's value systems in our culture. In most of these investigations the study of social values was incidental to other purposes. As a part of the Adolescent Growth Study at the University of California, this writer analyzed children's

opinions of each other, which had been collected by means of a "Guess-Who" or reputation test, in a search for those characteristics and qualities which boys and girls admire, respect, or approve in each other (12, 23). These opinions were available for about 160 boys and about the same number of girls at the beginning of junior high school, when over 90 per cent of the group were eleven and twelve years of age. Similar data were analyzed for this same group of boys and girls (with a few changes in the personnel of the group) three years later when they were completing the ninth grade. Other extensive records were accumulated by members of the research staff, including observations made by adults on various aspects of social behavior. According to the observational and physical data, the majority of the children at the first testing were either in the late childhood period discussed above or in the next phase, that of exaggerated withdrawal from the other sex.

At the time of the second analysis, at the end of the ninth grade, a majority of the girls had completed or were about to complete the "excited stage" of pubescence. While a small group of the boys had reached the same level as the girls, the majority of the boys had not, though many of them had, begun to be interested in their own appearance and were making those first tentative, awkward social gestures that characterize behavior in the middle period of adolescence. Following are some of the interpretations of the test data offered by the writer.

The most admired qualities in the boys at the eleven- and twelve-year level were competence in group games and ability to lead or direct or keep a game going, together with fearlessness and readiness to take a chance. It was much more desirable for a boy to be aggressive, boisterous, and to a degree unkempt, in preference to being submissive, extremely reserved, and too clean. It was also important to be thought of as enthusiastic, happy, or jolly, and there was a tendency to associate these qualities with leadership and skill in games. Also appreciated were certain qualities which we are prone to think of as "feminine," such as gentleness, personableness, friendliness, and a quiet sense of humor, providing these were associated in the individual with some of the "masculine" skills. Much more often than one would expect by chance those characteristics which constitute problems for the teacher in the classroom, such as restlessness, talkativeness, and attention-getting, were associated with especially admired characteristics, such as enthusiasm, good humor, and leadership in games.

In an analysis of the children's opinions at this earlier age level a very different pattern of values appeared for girls. This is what one

would expect if one were supporting the hypothesis that group behavior is closely associated with a group value system, since this was the period in which boy and girl groups were most sharply withdrawn and insulated from each other. In girls aggressive, boisterous behavior was strongly disapproved. So were restlessness and other behaviors which cause disturbance in the classroom. Most important in determining prestige for girls were such qualities as being friendly, pretty, tidy, and quietly gracious. Other qualities which were considered important included enthusiasm, quiet good humor, and docility. To be a tomboy was acceptable, but not a role to be sought or emulated. Certainly the girls' value system at this level, in so far as it was revealed through the medium of children's opinions about each other, conforms much more closely to what most teachers and other adults, who are primarily concerned with training toward adult social conformity, are trying to establish in both boys and girls.

During the three-year junior high school period the values for girls underwent revolutionary changes; in comparison, the changes for boys were much less marked. At the end of the ninth grade, when the group was fourteen and fifteen years of age, the value system for boys still placed great emphasis on physical skill and daring, and leadership in games was still extremely important for status in the group. But this constellation of abilities and characteristics was no longer of supreme importance. Probably equally important were such qualities as social ease and poise, personableness, likeableness, and grooming, which were undoubtedly related to the obvious rise of heterosexual interests, as indicated in observations by staff members. These two patterns which depicted physical competence and heterosexual effectiveness were rather closely associated in the sense that if a boy were recognized as superior in one he would probably be thought of as adequate or superior in the other. Boisterousness, restless activity, and attention-getting had ceased to have much significance, either positive or negative, except that in the minds of boys and girls these qualities seemed to be associated occasionally with childishness.

Much more fundamental changes had taken place in the girls' value system. The sedate "little lady" design for status in the younger girl was replaced by several new patterns. One of these implied buoyant amiability and rather aggressive good sportsmanship with both boys and girls in large groups. Dominating tendencies which had been abhorred before, now become desirable. With respect to boisterousness, restlessness, and other related characteristics, the values were reversed for girls to the extent that they were regarded as acceptable at this

older age level. Another constellation of qualities had become very important; this described the "glamor girl" type of individual, the attractive, well-groomed, sophisticated person. Unlike the boys at this same age level, for whom heterosexual attractiveness was closely associated with "masculine" skills, strength, and assertiveness, these glamorous qualities were not associated with any of the other patterns of values for girls. The boys who were effective in social heterosexual situations were the boys who were able to achieve the respect of the other boys for their physical skills and stamina, but the girls who were most attractive to boys could be liked or disliked or even regarded almost with indifference by their own sex.

One is impressed, after an examination of these data, with the complexity of the task of maintaining status with the contemporary group, confronting individual boys and girls as they progressed from childhood to adulthood. High status in the group, often thought of as leadership, was obviously compounded out of more than the qualities or characteristics of a particular individual (15). High status was the resultant, at any one particular stage, of the needs and purposes of the group and the particular readiness of some individuals to clarify, to represent, to give concrete expression to these group needs, purposes, and objectives (24). Individuals in turn who managed to orient themselves in the changing value system and behavior pattern undoubtedly achieved a sense of adequacy which derived from a feeling of belonging, or participating in and contributing to the group, and from the recognition and appreciation which the group accorded them. Of the two hundred children who were observed and studied during the seven- or eight-year period, from the fifth grade through the twelfth, there was no one who managed to maintain top status in the group throughout the period; many individuals experienced marked changes in status positions. This meant that some individuals had to deal with the anxieties that loss of status produces, others had to manage the adjustments that new success brings. Further, the sense of adequacy which mastery of the mores usually gives the individual by no means assured all individuals of the security that comes with warm, close friendship. On the other hand, some individuals who for one reason or another had little or no status in the larger group came through these years with some degree of stability and a measure of satisfaction because they had a close friend or two (usually of their own sex). There were some individuals who maintained top position in the group for a long period of time without close friendships. These individuals were the ones who seemed to suffer most when the inevitable shock of losing

status came. Those who had close friends as well as leadership positions in the group weathered declining status much more satisfactorily.

Thus far in our research thinking, we have tended to confuse status-belonging and friendship-belonging in very much the same fashion that our subjects do when we ask them, "Who are your best friends?" Some boys and girls choose or are chosen "friends" almost entirely on the basis of status or prestige; others almost entirely on the basis of warm feelings of love and affection; many, of course, employ both of these criteria in some mixture or other. Friendships, in which mutual affection is the main tie, in which the individual is valued for himself and his capacity to share affection and not for what he had done, are much more difficult to analyze and generalize about than relationships based on status. In our guidance practice also we confuse these two social processes, most often failing to recognize the importance of affectional relationships for the security and happiness of individuals at their current stage of growth, and for the achievement of their full capacities in maturity. We are inclined to relegate affection to family relationships, disregarding this basic need in all other relationships.

There are a number of reasons why the particular group and its values which are described above should not be taken as descriptive of children and adolescents throughout American culture. This particular study of children's values dealt with a group of predominantly middle-class children in a metropolitan area in California. Very different perhaps would be the cultural values of the boys and girls with whom "Julie" grew up to maturity. Davis and Dollard (6) describe some of her behavior as follows: "As a child, she was a favorite with the 'across-the-tracks' gang of boys and girls. They fought with rocks, knives, and sometimes with pistols. At fourteen she saw a boy badly stabbed by another in an argument over her at a school picnic. She married at sixteen, and had a fist and chair fight with her husband the first time she saw him after her marriage. . . . She retreats only when severe punishment is certain—when her opponent has a knife or pistol, or when a teacher threatens her with expulsion from school." Other factors than social-class status and geographical area undoubtedly affect the children's value systems. The California group went through an elementary, junior high, senior high school system. Toward the end of junior high school the girls' values were probably affected by the fact that they were excluded from the society of senior high school boys who were of the same maturity level as they. One important value pattern, that of being the good companion, the jolly, hail-fellow-well-met mixer, was probably overemphasized because it worked with these

younger boys who would have been frightened by a more distinctly feminine pattern.

However, there is some evidence to suggest that the value patterns found for the California group would be reiterated in other groups of the same developmental level, with, of course, different emphasis, additions, and changes. Minehan (13) found that the boy-tramps whom he studied during the depression years admired physical size, strength, and agility in very much the same fashion that the California boys did, but with added emphasis since "on the road the strong live and the weak die." Another quality which makes for prestige in both groups is what might be described as fearlessness or daring, and readiness to fight or face danger when necessary. One of Minehan's group remarked, "What I like about Nick . . . is that he has plenty of guts." In both groups physical skills are admired, but the skills were different. In the California group it was competence in group games; in Minehan's groups it was skill in catching rides. He says, "At the top of the hierarchy are the aristocratic 'passenger stiffs' who ride nothing but through trains." We do not know to what extent patterns and partial patterns of values which we have seen in these two boy-groups would be repeated if we had adequate analyses of subadult groups representing various developmental levels, areas, and conditions of the larger American society. However, there seems to be no question that if we are to live effectively with children and adolescents we must know much more than we do about their cultural values.

IV. DIFFERENTIATION OF THE SEX ROLES IN THE ADOLESCENT PEER GROUP

The preceding discussion in this chapter indicates that much of the time and activity which boys and girls share in their contemporary groups during adolescence are directed toward exploring and endeavoring to master their sex roles as these are envisaged for adults in our society. Each individual faces the common task of heterosexual adjustments at adolescence, but with his own particular readiness or lack of readiness which derives from his own history from infancy. Achieving mastery of one's sex role in adolescence is a process of reintegrating past experiences with new physical impulses, new expectations from the peer group and from adult society. Each individual's readiness (3) depends upon the kinds of feelings he has about his father and mother which have accumulated through the years, his feelings about the "goodness" or "badness" of his own body, the way in which he has explored adult roles in fantasy play of early childhood, the successes

or failures he has had in identifying with his own sex play-group in late childhood, and so on. Pubescence brings these past experiences into focus on new tasks and problems. Frankwood Williams says, "These four or five years hold the only chance the average boy and girl will have to establish their heterosexuality. Once prevented, it can never come naturally and normally again. It is a real problem, therefore, that faces the child" (25).

Boys and girls during adolescence must learn roles that complement each other (12). This is very different learning from that of late childhood where social learning seems to disregard the role of the other sex. During adolescence, in a sense, the individual learns not only about his own sex role, but to complete his learning he must learn about the role of the other sex and the relationships between the two. This adjustive task inevitably faces every adolescent. Each individual is coerced in a number of ways to recognize the primary tasks of social development—though in a very vague way, perhaps—whether or not he masters them. His own body, with its obvious external transformations and the urgency of new, often poorly understood impulses, forces upon him new problems. New problems are also presented by the peer group, which expects from him different behavior and more mature attitudes and values. If the persisting life needs for belongingness and for affection and friendship are to be satisfied, the individual must meet the requirements which the group sets up; if he does not meet them, he still feels their force.

In the transition from childhood to manhood or womanhood the boy and girl do not face identical problems. Zachry points out that in one very fundamental way greater change is expected of the boy than of the girl (26). The boy is expected to become independent and self-reliant and to develop capacities for competition and achievement in our society, while the girl is not. Her progression toward maturity is not marked by this same discontinuity, or at least not nearly to the same extent. American society still conceives of woman's life objectives as primarily concerned with marriage, family, and affectional relationships. The girl, in order to achieve maturity, does not have to deal with the same pressures as the boy, and does not have to give up the fundamental attitudes of dependence and submission that characterize childhood for both boys and girls. These differences are evident in the peer groups even at the late childhood level where the boy strives much more than the girl for mastery of skills in group games and where he is more overtly aggressive and assertive. However, this sex difference is not as clear-cut as it was a few generations ago. In the

first place, women have assumed more and more the position of authority in the family group (9). In America the husband and father has given over to the wife and mother many of the rights, privileges, and responsibilities which the patriarchal position in the family holds in Western Europe. In the second place, girls and women for several generations have begun to take their places in business, industry, and the professions, competing with men for recognition of achievement. During adolescence they take many of the same courses in high school and college, preparing themselves for the same jobs and positions. Hence, there are for the girl, superimposed on fundamental attitudes of submission, certain newer pressures and expectations that sometimes make it difficult for her to project her sex role clearly into adulthood.

Although in meeting some adult standards girls must undergo less change than boys, in their relation to their own peer culture they must often be more adaptive in relation to changing requirements. We have already discussed the value systems which were analyzed for boys and girls at the beginning and end of junior high school in the California study. We saw there that in this group the girls much more than the boys were required to adjust to changes and reversals in their value pattern if they wished to maintain status in the group. Further, there was again more change for the girls late in high school than was the case with boys (12). Analysis of the same data (by different techniques) indicates that the admired girl at the later years of high school was one who had one of several kinds of what our culture considers essentially feminine patterns. The one pattern, which was so important for the girls at the ninth-grade level—that of aggressive good-fellowship, which seemed to be an adaptation to the inadequacies of the younger boys—was no longer particularly important at the higher level. For the boy, physical prowess, skill in athletics, and physical assurance continued all through high school to have outstanding prestige value. However, the base for achievement had broadened to include success in other areas such as dramatics, student government, journalism. The other important pattern which emerged late in junior high school and which included poise, grooming, and other characteristics that make for heterosexual effectiveness, continued to be an important determiner of status for the boy in the following years. In other words, the concrete and specific requirements of the peer value system gave to the boy a much more steady, continuous array of references for evolving his sex role during this growth period than they did to the girl (12).

In other ways the boys seemed to have more opportunity to clarify their sexuality than did the girls. Particularly important in this was

their much more extensive use of verbalization and humor. Boys discussed the structure and function of their bodies with considerable freedom, usually in what is called "gutter" parlance. Girls discussed such topics very rarely, especially during the pubescent stage; those who did were seriously handicapped by lack of vocabulary, since they did not use the language that the boys did. Further, boys were more prone to relieve tension with jokes about sex and about other functions of the body in a way that was practically unknown among the girls. Finally, except for those individuals who were handicapped by physical deficiencies of one sort or another, boys with other boys or men, such as physicians, in dressing rooms and physical examination rooms, were completely unconcerned with what one could term modesty. The girls, particularly during the pubescent phase, were almost arrogantly modest. In their frantic effort to cover up or be screened off in the dressing room and in their resistance to the examinations by women physicians, they seemed to be trying to deny the physical aspects of their sex role. It should be noted again that this group was predominantly a middle-class group of boys and girls. These behaviors, however, and the attitudes which they imply reveal some of the problems which are very commonly involved in the process of social-sexual maturing.

It is a long, complex, and often confusing learning-task to achieve manhood or womanhood in our society with the skills and behaviors, the attitudes and values appropriate to the role which a given individual must take. For the most part boys and girls work at these tasks in a stumbling, groping fashion, blindly reaching for the next step without much or any adult assistance. Many lose their way. It seems probable that our adult failure to give assistance derives as much from ignorance about this developmental process as it does from the extensive taboos on sex which characterize our culture.

V. THE RELATIONSHIP BETWEEN THE SUBADULT SOCIETY AND THE SURROUNDING ADULT CULTURE

The subadult cultures in our society have been discussed above almost as though they were floating islands, unattached, unrelated to the surrounding adult world. This is undoubtedly an exaggeration, but it has too much of truth in it to be dismissed lightly. During the last decade or more, until the beginning of the war, the question of what to do with children and youth had begun to loom as a serious problem, particularly in urban and large metropolitan areas. They were not needed in the economic affairs of society, and the questions, how can

we occupy their time, how can we train them for a future participation in a society that at the moment does not need them, had become acute.

During the last twenty or thirty years there has appeared a great variety of recreational agencies such as neighborhood clubs, playground associations, summer camps, Boy Scouts, which have sought to control the gregarious interests of boys and girls. These efforts to direct the activities of children and youth were not prompted primarily by a clear understanding of the needs of youth and the important developmental problems being attacked in the peer group, though they were concerned with providing "healthful" and "wholesome" conditions for growing up. The more imperative reason for promoting "youth-serving" agencies grew out of the antisocial products of increased leisure time—destructiveness, delinquency, and just plain mischief.

The several institutions—family, school, church, recreational agencies—which train American children are characterized by a peculiar kind of discreteness with regard to each other in their dealings with children. They do not form that dynamically integrated pattern of concern and purpose that is typical of many primitive groups or that was fairly typical of our society in its earlier history. In the time of our grandparents and the generations before them, boys and girls grew up in a society where the family and the communities of interdependent families were the centers of education and training for children and youth. Boys and girls were needed in the economy of those communities; as they worked, they learned.

At present the home, at least in the metropolitan and urban areas, is no longer the center of industry, though the family is still primary in providing emotional security and understanding of personal relationships. Boys, particularly, have no direct experience with the kinds of work which will be expected of them in adulthood. In crowded areas children go distances to find play space. They spend a large part of their time in school, where they learn about their world in a highly vicarious fashion. It is relatively rare for any of these institutions to inter-relate their understandings of the child, their objectives and procedures in his development and education. Each is a relatively insulated training institution. Even in the school itself the child who experiences a fully successful effort to organize and integrate his school experiences is both rare and fortunate. Usually children move from one grade to another at intervals of six months or a year, so that each teacher sees them leave her just when she is beginning to know them. At the sixth or seventh grade—often earlier—children begin to enter departmentalized programs where they have a different teacher every

class period and, therefore, even less opportunity to be understood.

The peer group, whether it is a neighborhood play group, a social clique, or a delinquent gang, offers the child or adolescent greater continuity in terms of time, and more understanding than he finds in most adult-directed groups. Among his own age-mates he is continuously regarded as a human being, a total personality; in adult-directed groups some artificially separated aspect of him is regarded as in need of training by this or that adult leader in the school, the Sunday school, or the recreation center. Next to the family in childhood, and probably equally with the family during adolescence, the peer group provides satisfactions to the basic urges for security in the warmth of friendship and the sense of adequacy that come from belonging. With the tremendous geographical mobility which the war has produced in the civilian population, a hitherto unprecedented number of boys and girls are experiencing the deprivations and discontinuities that result from losing their group. They face the anxiety-producing task of re-establishing themselves in new groups in strange communities.

It has already been suggested above that to a large extent the contacts which adults in authority make with the spontaneous social groupings of boys and girls are authoritarian in character. In fact, autocratic relationships prevail, by and large, in most of our institutions for child care, training, and education (8). Boys and girls protect themselves by pooling their resistance in groups and throwing up barriers of one kind and another against adult authority and adult interference, but this does not mean that the quality of relationships within the group is not affected by the coercions, pressures, and expectancies which adults exert. Lewin, Lippitt, and White (10) for example, in their study of experimentally created social climates, found that expressions of hostility of one sort or another displayed by the children toward each other were many times more frequent in the group with an autocratic leader. They observed that this aggression was directed toward scapegoats within the group, not toward the adult "autocrat." Redl (18) has made a preliminary examination of ways in which adult leadership and direction affect the interplay of personalities within groups of boys and girls. He distinguishes ten types of leadership, which are "auxiliary concepts for exploratory purposes only." He warns the observer that the emotional structure of any group is hard to assay because of the disparity "between the actual underlying group emotional constellation and the surface manifestations of overt group verbiage and group behavior. . . ." There is no doubt that we do need extensive research to understand the nature of our methods of dealing

with children and adolescents and the effects of these on their interpersonal relationships. Anyone who has observed children in classrooms and children leaving classrooms for the playground has probably observed great differences in the ways the children behave to each other as soon as they reach the freedom of the outer door. Some groups move from the classroom to the playground with little or no change in behavior. In other groups half the children kick, shove, and slap the other half of the group without apparent discrimination. And it takes no great skill in observing to see that usually there is a close correlation between these differences in the children's behavior and the amount and kinds of coercion in the teacher-child relationships in the classrooms. But, as yet, we have not delineated or described much of the complexity, the subtlety, the nuances of the relationships between the adult leaders and the younger group.

We have discussed here one kind of discontinuity in the lives of children and groups of children, namely, the one caused by the discreteness, the noninterrelatedness, of the various institutions and agencies that deal with the child or the group during any one day. Benedict (2) has analyzed another aspect of the situation confronting adolescents, in which *time* is the dimension in which discontinuity occurs. This will be discussed more fully in the chapter to follow. In our society, children do not achieve adult status through the succession of rituals and observances ("rites of passage") that mark development in many societies. In some contemporary primitive societies certain culturally valued individual accomplishments are recognized with feasts and ceremony, and new, more clearly adult privileges and responsibilities are thereafter accorded the boy or girl. In others, the beginning and the end of various culturally described stages of development are observed with similar ceremonies and rituals, followed for the individual by new status. In this way, individuals or groups of individuals are inducted into their adult roles. Practically the only rite which we have that is actually followed by a change of childhood status, particularly for girls, is marriage.

It is rather amazing that so many boys and girls in our society do achieve identification with our cultural values and purposes in late adolescence, since we have so little use for children or youth in our economy and so few effective, widely recognized ways of inducting them into our society. However, the number who resist or fail to achieve such identification is all too great. Most of the resistance is not effected by individuals as individuals; it is achieved and maintained by groups. We can see it in the delinquents who cling to their adolescent

gang, rejecting completely the accepted standards of adult society. But organized resistance to becoming adult is more widespread than the delinquent gang. Some degree of it can be observed in many groups that include boys and girls who are physically mature young adults. Currently the "zoot-suit" movement is an illustration of effective clinging to a subadult society. Such groups have their own particular cultural patterns—unique slang language, special costume, and dance rituals. These serve the two-fold end of welding the group together and of setting up barriers against the demands and pressures of the adult world, a world which has not for the most part welcomed children and youth as an integral part of it.

REFERENCES

1. ALLPORT, GORDON W. "Attitudes," *Handbook of Social Psychology*, pp. 798-844. Worcester, Massachusetts: Clark University Press, 1935.
2. BENEDICT, RUTH. "Continuities and Discontinuities," *Psychiatry*, I (May, 1938), 161-67.
3. BLOS, PETER. *The Adolescent Personality: A Study of Individual Behavior*. New York: D. Appleton-Century Co., 1941.
4. CAMERON, W. JAFFRAY. "A Study of Early Adolescent Personality," *Progressive Education*, XV (November, 1938), 553-63.
5. CAMPBELL, ELISE HATT. "The Social-Sex Development of Children," *Genetic Psychology Monographs*, XXI (November, 1939), 461-552.
6. DAVIS, ALLISON, and DOLLARD, JOHN. *Children of Bondage*. Washington: American Council on Education, 1940.
7. ELLIOTT, MERLE. "Patterns of Friendship in the Classroom," *Progressive Education*, XVIII (November, 1941), 383-90.
8. FISHER, MARY SHATTUCK. "If We Will—We Have the Future," *Progressive Education*, XX (March, 1943), 98-102.
9. FROMM-REICHMANN, FRIEDA. "Notes on the Mother Role in the Family Group," *Bulletin of the Menninger Clinic*, IV (September, 1940), 132-48.
10. LEWIN, KURT; LIPPITT, RONALD; and WHITE, R. K. "Patterns of Aggressive Behavior in Experimentally Created 'Social Climates,'" *Journal of Social Psychology*, X (1939), 271-99.
11. LINTON, RALPH. "Age and Sex Categories," *American Sociological Review*, VII (October, 1942), 589-603.
12. MEEK, LOIS H. (ed). *The Personal-Social Development of Boys and Girls with Implications for Secondary Education*. New York: Progressive Education Association, 1940. Pp. 243.
13. MINEHAN, THOMAS. *Boy and Girl Tramps of America*. New York: Grossett & Dunlap, 1934. Pp. xvii + 267.
14. MORENO, J. L. *Who Shall Survive?* Washington: Nervous and Mental Disease Publishing Co., 1934. Pp. xvi + 437.

15. MURPHY, ALBERT J. "A Study of the Leadership Process," *American Sociological Review*, VI (October, 1941), 674-87.
16. PARSONS, TALCOTT. "Age and Sex in the Social Structure of the United States," *American Sociological Review*, VII (October, 1942), 604-16.
17. PLANT, JAMES S. "Present Pressing Problems in Childhood Education," *Childhood Education*, XIX (March, 1943), 293-99.
18. REDL, FRITZ. "Group Emotion and Leadership," *Psychiatry*, V (November, 1942), 573-96.
19. SHEVIAKOV, GEORGE. "The Necessity of Understanding the Adolescent as a Basis for Curriculum and Guidance," *Journal of the National Association of Deans of Women*, V (October, 1941), 7-12.
20. SHUTTLEWORTH, FRANK K. *The Physical and Mental Growth of Girls and Boys Age 6 to 19 in Relation to Age at Maximum Growth*. Monographs of the Society for Research in Child Development, Vol. IV, No. 3, Washington: National Research Council, 1939.
21. STOLZ, HERBERT R.; JONES, MARY C.; and CHAFFEY, JUDITH. "The Junior High School Age," *University High School Journal*, XV (January, 1937), 63-72.
22. STOLZ, HERBERT R. "A Condensed Description of the Data and the Findings Concerning Some Physical Aspects of Development." University of California Study of Adolescents. Unpublished mimeographed manuscript on file, Division on Child Development and Teacher Personnel, Commission on Teacher Education, American Council on Education. Chicago: The Division, 1940.
23. TRYON, CAROLINE. *Evaluations of Adolescent Personality by Adolescents*. Monographs of the Society for Research in Child Development, Vol. IV, No. 4. Washington: National Research Council, 1939.
24. University of California Study of Adolescents (Unpublished data 1932-39).
25. WILLIAMS, FRANKWOOD E. *Adolescence: Studies in Mental Hygiene*. New York: Farrar & Rinehart, 1930. Pp. xi + 279.
26. ZACHRY, CAROLINE B., and LIGHTY, MARGARET. *Emotion and Conduct in Adolescence*. New York: D. Appleton-Century Co., 1940. Pp. xv + 563.
27. ———. "Emotional Problems of Adolescence," *Bulletin of the Menninger Clinic*, IV, 3 (May, 1940), 63-73.
28. ZULLIGER, HANS, and SWACKHAMER, GLADYS V. "Psychoanalytic Experiences in Public School Practice," *American Journal of Orthopsychiatry*, XI (January, 1941), 157-71.

CHAPTER XIII

THE ADOLESCENT AND THE FAMILY

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As pointed out in other chapters of this yearbook, the boy and girl during the second decade of life face certain life tasks as unescapable aspects of their biological maturation and of their induction into adult living. In this process they are exposed to the influence of many cultural agencies. The principal medium through which culture operates is, in earlier childhood, the family. In a static, tradition-bound society the family may continue this all-important role into later childhood and adolescence, for in such a society children can learn from the parents and elders of the group all they need to know and do, and thus go on to adult life with no break in traditions. But if a society is to change and continually adapt itself to new knowledge and novel practices, children must to some extent relinquish parental beliefs and practices and learn the ideas, the techniques, and the patterns of conduct of their own generation. In our society we have developed schools as the socially sanctioned, publicly supported agencies for the purpose of training youth for adult responsibilities.

Although the concept is not always clearly formulated, the schools serve as instruments for social change, and they also provide many of the occasions for adolescent boys and girls to receive their inculcation of adolescent culture—that body of attitudes, of beliefs, and of practices which is transmitted, not by parents and teachers to children, but by older adolescents to younger adolescents.

When, as in recent approaches to this problem, we examine the operation of adolescent culture, we are struck by the intricate and often sharply conflicting processes at work upon adolescents, at home, at school, and in other social relationships. As members of a family, of an adolescent age group, of a maturing sex group, and of various educational and youth-serving organizations, they are often pulled

or drawn both forward and back, and are subject to conflicting loyalties, desires, and aspirations.¹

Space is lacking within this chapter to examine the multitudinous aspects of these processes by which the adolescent comes of age; the discussion is, therefore, limited to some of the more critical aspects of the adolescent's relations to his family. It must be remembered that there are many different regional subcultures, and many socio-economic groups, educational levels, and religious demarcations. For obvious reasons we know more about the "middle-class" families in our culture, and while these are by no means homogeneous they provide us with a fairly coherent body of information as to what happens to many of our boys and girls in the years preceding adolescence.

I. ATTITUDES TOWARD SEX

It is now generally agreed that the adolescent's attitude toward sex is an important feature of his adjustment to his own biological maturation and to the culture in which he finds himself. Until recently, save in some exceptional families, it has been customary to regard matters involving sex as more or less shameful. It was considered depraved and perverse for children to be curious about biological processes and anatomical differences; adults were confirmed in these attitudes by the church and other social influences.

The little boy and girl who exhibited interest in his or her genitals and made the usual childish explorations (all parts of the body may be equally important to a little child) was often sharply rebuked or even punished. Any handling of the genitals or deliberate manipulation was watched for and by various methods, physical punishment, tying of hands, and threats of dire and terrifying consequences, summarily stopped—so long as the child was under scrutiny. Needless to say, this treatment often served to fixate interest on the genitals and enhanced the pleasure of surreptitious attentions, not without accompanying feelings of anxiety and guilt.

Thus, for many children the earliest experiences associated with the genitals or other aspects of sex were highly charged emotionally. During the rest of his or her childhood the child who had been detected in such infantile proclivities was apt to be especially watched and, by various forms of punishment and threats, made to feel that he was a uniquely wicked and perverse individual. His initially wholesome orientation toward his own body and his early natural curiosity about

¹ Cf. the collection of papers dealing with sociological research in adolescence, *American Journal of Sociology*, Vol. LII, No. 1, 1936.

sex differences were effectively blocked and, with that blocking, came a feeling of guilt even at the verbal reference to sex. Sometimes children discovered other children of similar "perverse" interests and they shared their guilty secrets and clandestine pleasures; often, however, the individual child carried his guilt alone.

Questions about where babies come from and how they are made, also indicative of the little child's very natural curiosity about really important events, were usually met with folklore tales of the stork, the doctor who brought the baby from nowhere, or hushed reference to God who made the baby, and similar subterfuges designed to mislead and confuse the child and deny the facts of human procreation. Pregnancy was wrapped in mystery or even shame, and the pregnant woman often tried to conceal her pregnancy, especially from her older children. Space is lacking here to discuss the shock and often profound anxiety to the little boy or girl whose mother suddenly disappears, to return in a week or two with a new baby, a rival for mother's attention and love. It may be said, however, that this experience has often served to accentuate the general feeling tone associated with sex, babies, and the like, as mysterious and fearsome.

The significance of these early experiences is that during infancy and childhood, sex is officially tabooed; at the same time it becomes an occasion for frequent uneasy attention, relieved later by the usual smut and dirty stories which children pick up and relate to each other, usually with very incomplete comprehension. In those families where the mother is herself strongly reactive against anything sexual and has rejected the female role, she may deeply disturb the sex development of her children by attitudes, opinions, beliefs, and strongly expressed feelings about anything sexual. The boy especially is susceptible to the mother's deprecation of male interests and male behavior and so may learn to fear and despise his own genitals and masculine interests. It is in the early, preschool years that the boy and girl should begin to clarify the male and female roles, to accept their masculinity and femininity and thus achieve their first steps in psychosexual development. What should be a natural, wholesome period of orientation and of emotional adjustment to sex roles, at a time when sex is not as urgent and critical as in adolescence and adult life, is only too often a period of anxious uncertainty or of embarrassed humiliation. Sex for the young child is never a source of emotional disturbance until an adult makes it so by his or her teaching and emotional reactions to the child's natural interests.

When the boy and girl come to adolescence and begin the process

of adjustment to the stirring of impulses and the awakening of interest in the other sex, they may be initially handicapped, if not defeated, by early distortions and emotionally charged experiences. It is obvious that, if they have grown up feeling that interest in anything genital or sexual is bad, they must feel guilty at this time over the most innocent of concern with the other sex. Again, if they resume the autoerotic practices of early childhood,² which have perhaps been dormant for the past few years of the so-called latency period, they will be subject to recurrent anxiety and guilt.

After a period of fluctuating interests in their own sex (the so-called homosexual phase of adolescence), boys and girls are impelled by biological maturation toward the other sex; due, however, to inhibition from their earlier feelings and beliefs, and to the awkwardness of their new approach, they often have an exceedingly difficult time clarifying and accepting the requirements of their masculine and feminine roles.

It is indeed ironic to see how many parents and other relatives become suddenly solicitous about their children's social success, wanting them to be liked and popular with the other sex, more or less openly hinting they should have a beau or a sweetheart, but forgetting how they have for years made the boy and girl uneasy if not anxious about the other sex and have imposed psychological handicaps by their earlier teachings. It is also ironic to recall that when boys and girls are most eager to make an approach to each other, to discover what a man and a woman mean to each other and how they should act toward each other, we can only offer them "sex education," i.e., teaching about procreation which is the last thing they are really concerned

²In a study from the University of California Institute of Child Welfare, Willoughby (11: 18-29), compares age curves showing the rising incidence of masturbation during adolescence, pointing out, "The proportion of boys increases steeply while that of girls rises very slowly; the total proportions which the curves appear to be approaching are of the order of 80 per cent and 40 per cent." He also notes, "It seems clear that in western European cultures as they now exist, self-gratification is the typical sexual behavior of early and middle adolescence, and that the boys in these cultures are considerably more addicted to it than are the girls. It is reasonable to believe, on the basis of intercultural comparisons from such data as we have, that this dominance of autosexuality is largely a repression phenomenon, i.e., that children are driven to gratify their own sexual needs by culturally enforced lack of heterosexual opportunities; and on the same evidence it appears likely that the sex difference found is cultural rather than biological, and represents more effective banishment of sexuality from the consciousness of girls than of boys. Further studies addressed particularly to these problems would be very valuable" (11: 28).

about. They want to know, not about babies, but what you do with sex, what you can give and receive from the other, what love means. Instead of giving them our best knowledge and wisest counsel and helping to direct these interests, the cautious parent may instead concentrate upon terrorizing them with the dangers of venereal disease.

The role of the parents in this sex maturation and in the acceptance of roles needs to be more clearly understood. As indicated, the masculine and feminine roles involve polarized positions and activities; they are what a man does to and for a woman and vice versa. During early childhood and especially in the early days of his sex maturation the boy should be able to play up to the mother, his first focus of interest and attachment to a person of the opposite sex. But if she cannot accept this function and so give him the encouragement and the response he needs for clarifying the masculine role, he may be compromised in his progress. Likewise, if she makes him feel that the male's interest in sex is repulsive to a woman, she may handicap or even completely block his psychosexual development. If on the other hand the mother is possessive and clings to her son, denying him the freedom to go out to the girls of his own age, she will be no less effective in arresting his psychosexual development and preventing him from playing the masculine role to a woman of his own age group.

The son's relationship with girls is also influenced by the way in which the father treats the mother. He may react by copying the father's attitudes, or on the other hand may react against the father and adopt a wholly different role, especially if the father is cruel or antagonistic to the mother. The intricacies of this relationship of son to father and to mother are too complicated for full discussion here; suffice to say the mother and father are actively influencing the boy by what they say and do and by their customary conduct and long-established marriage relationship.³

The girl especially is susceptible to this family drama and to the father's relationship to herself. She needs the father's overt approval and outspoken admiration of herself as a young woman, to help her to clarify and accept her feminine role, especially to be a

³In Terman's (10) study of 792 California couples, it was found that a repressive attitude of parents toward sex curiosity was an unfavorable factor for the later marital adjustment of their children; among other strongly unfavorable factors were harsh discipline, severe and frequent punishment, conflict with parents, and disgust or aversion toward sex. Significant also is the report of Burgess and Cottrell (3), based on case studies of 100 married couples, showing that affectionate relationships established within the family during childhood are a principal dynamic factor determining the expression of affection in adult life.

woman in "a man's world." If the father ignores her or continually criticises her, or if he demands that she achieve something—school grades, social or other prestige, and similar signs of success—in order to gain and hold his approval, then she may find it difficult to accept the feminine role. From clinical records there are indications that some of the young girls who are involved in sex delinquencies and who have venereal infections are individuals who have never accepted, indeed have rejected, the female and feminine role. They are likely to be daughters from families where the mother has been of little importance, receiving little or no respect from her husband, often a cowed, submissive wife; moreover, these girls have never enjoyed approval or admiration from their fathers and so have never developed any feeling of being a woman with a sense of their own dignity or worth as a woman. Consequently they have no difficulty in playing the role of sex object, offering themselves freely to any casual male, calculatingly cool and deliberate. They have little sex interest and are passive if not frigid. To speak of them as the victims of passion, or weak-willed individuals who could not resist sex temptation, is to misunderstand completely their conduct and their feelings. By exercising power over men, some are getting revenge for the years of humiliation they have suffered as girls under dominant fathers and contemptuous brothers.

Likewise there are indications that the persistent adult homosexual is often an individual who has been unable to accept his or her sex role as male or female because of early sex teachings and experiences, dominant parents, and other forms of blocking in psychosexual maturing. Such individuals may drift into a homosexual relationship wherein they play either an active or a passive part, according to their personality make-up.

The confusion and conflict over the feminine roles today, the uncertainty about what one does to be a woman, is acute for adolescent girls. They no longer can find the patterns and the skills they need by following the examples of their mothers, since homemaking is changing so rapidly and women's activities and interests have shifted from the older traditional practices. Moreover, even if a woman would prefer to be a homemaker and mother of a family and limit her efforts largely to those domestic activities, she may be compelled to seek an outside job in order to help support the home and rear her children. In those groups in which child bearing is losing its social significance and even being devalued, the girl is further perplexed, torn between her desire for biological and emotional fulfillment as a mother and the need for social approval and status to be gained in jobs and achieve-

ments. In many social groups women have traditionally adapted themselves to the ideals and decrees of men; today men are uncertain as to what kind of wives they want, and so women are correspondingly uncertain as to where and how they should focus their aims. These are only a few of the bewildering conflicts confronting young women who so often find not only a lack of helpful guidance and reassurance in parents but outright opposition and sometimes active frustration of their aspirations and acute emotional needs.

II. EMANCIPATION FROM PARENTS

As indicated earlier, emancipation from dependence upon the family and from the childish submission to parental authority are acute adolescent problems in our society. Again we should look at what has taken place for many children before adolescence in order to understand the background of these problems.*

It has been customary for parents to expect and to require obedience on the part of boys and girls in early childhood. Children have been looked upon as unreasoning creatures who should obey without question, who should never doubt parental wisdom and who should seldom attempt to decide for themselves but rather always do as directed. While this older parental pattern has been altered as parents have become less certain of their authority and less assured about what children should do, still the feeling remains that young children should be directed in almost all aspects of life and given little or no opportunity to think and decide for themselves.

When a child brought up in accordance with these ideas and practices reaches adolescence, he is confronted with a strangely contradictory situation. Suddenly parents and teachers and others begin to reproach the child for lack of maturity, demanding that he show some sense, use some judgment, take some responsibility, exercise some discretion and stand on his own feet! The poor adolescent may never in his life have had an opportunity to use judgment or take responsibility, but now he is berated for inability to take charge of his own life.

But here again as with the acceptance of sex roles, there is a profound discontinuity in the lives of our children at the moment when they are called upon to establish themselves as members of their age

*"It all depends on what the parents try to achieve in the education of their offspring: whether the tendency is to make a child strong, courageous, independent, capable of dealing with all sorts of situations, or whether the main tendency is to shelter the child, to make it obedient, to keep it ignorant of life as it is, or in short to infantilize it up to twenty years of age or longer" (7: 83).

and sex groups.⁵ As pointed out earlier, the adolescent often looks to his own contemporaries, or a slightly older group, for his cues and the patterns of conduct he must emulate. In a changing society, especially a society such as ours where so many of the next generation must to some extent break away from parental ideas, beliefs, and ways of living (often derived from foreign traditions), the adolescent encounters the problem of challenging parental authority as the price of his own individual maturation and of acceptance by his own age group. This provokes bitter conflicts which sometimes lead the parents to invoke juvenile court action, demanding that a son or daughter be committed to a custodial institution, not so much for any illegal or antisocial conduct, as for their defiance of parental commands. It is often said that the conflict between parents and adolescents arises from the desire of the boys and girls for freedom. This is misleading, since adolescents do not want freedom in a complete sense nor would they know what to do with it; if they seek to be released from parental control and conformity to family patterns, this is largely in order that they may comply with the often more exacting requirements of their own age and sex group.

It cannot be emphasized too strongly that to become adult members of our society, boys and girls must escape from their childish submissive status, must accept responsibility for self-direction, and take their places among their own contemporaries. For some children who have grown up under dominating parents or over-protecting parents or parents who, without exercising overt authority over them, still have robbed them of self-confidence, there may be no anxiety over the problem of achieving independence; they are not only content to remain docile but they cling to their dependent place in a family that gives them security at the cost of their own further development. Such adolescents find it difficult to marry and, if they do marry, the sons

⁵ Ruth Benedict has pointed out the handicap which modern society places upon adolescents in this regard: "Although it is a fact of nature that the child becomes a man, the way in which this transition is effected varies from one society to another, and no one of these particular cultural bridges should be regarded as the 'natural' path to maturity. . . . In some societies the cultural institutions furnish adequate support to the individual as he progresses from role to role, or interdicts the previous behavior in a summary fashion. The contrast with arrangements in our culture is very striking, and against this background of social arrangements in other cultures the adolescent period of *Sturm und Drang* with which we are familiar becomes intelligible in terms of our discontinuous cultural institutions and dogmas rather than in terms of physiological necessity" (1: 161, 167).

frequently insist upon bringing their wives home, or close to home. The attachment to the father or to the mother is never broken; when the parents die, the now adult sons and daughters are quite bereft.

This picture of filial devotion has been so frequently praised that we may forget the price paid by these devoted sons and daughters who have been held so closely by parents that they could never grow up as independent adults. Often the discussion of these cases provokes angry comments and the accusation that one is caricaturing and despoiling the beautiful relation of children to their parents, even preaching lack of that respect for father and mother demanded by our Commandments. It must, therefore, be reiterated that parents are the chief source of the child's security and his major reliance for reassurance and love and affection. At adolescence the individual boy and girl are attracted to life outside the protecting home; they want to be accepted by their contemporaries, to explore the fascinating world of people and taste the experiences that seem so rich and adult. But their desire to go out to life is not unmixed with a need for continued protection and security; indeed the more they venture out, the more they need to feel they can return home and find help and reassurance.

Here is where the family faces its major opportunity to help and where, unfortunately, it so often fails to fulfil its parental functions toward adolescents (cf. 8). Parents sometimes alternate between alarm and urgency; they may be eager for their child to be popular, to be accepted, even to have him grow up to the extent of being more responsible, but they are fearful that he or she will get into trouble, make blunders, or incur disgrace by irresponsible conduct. Parents are especially disturbed and apt to be unwise in their treatment of adolescents when they see them engaged in some activity which in their own youth they found too difficult and embarrassing; hence they project their own earlier anxieties and conflicts upon children who may be quite unaffected by such problems.

It is not surprising that, out of petulance and bravado, the adolescent often does things he may not enjoy or like or approve of, just to show his independence and relieve his feelings of irritation. Parent-child relationships may be brought to a crisis over seemingly trivial issues which involve the boy's or girl's desire to do this or that but which the parents forbid. Then all the accumulated resentment of the adolescent and the accumulated exasperation of the parent pour forth into angry dispute and make the trivial issue a major conflict. No one who observes the American family with adolescent children can fail to be impressed by the frequency of unhappy parents and re-

sentful children who become so involved in disputes that long estrangements may occur. Such an outcome is particularly bitter for parents who may have lavished attention upon their children and given them everything they could desire but withheld the one most precious gift of independence, with the opportunity to grow up and become an adult.

These overt conflicts between children and parents are painful and serious, but another conflict which occurs in adolescence and which is often wholly concealed from the parent may be even more devastating and may seriously threaten the individual's mental health. At puberty or soon after, the adolescent begins, perhaps for the first time, to *see* people—to divest his parents of the hallowed images with which he endowed them in his childhood, and to look upon them as middle-aged persons no longer invested with the wisdom and the power expressive of his childhood belief. Likewise, the adolescent begins to look at the social life around him and discovers that it is in some respects different from what he has been told or has imagined. For many children the social world outside has, at least implicitly, been interpreted by parents as a well-organized, orderly life. They are repeatedly told to observe the contrast between the older generation, pictured as well behaved, law-abiding, and otherwise wholly respectable (except for a few perverse characters) and the younger generation, which is so deplorably lacking in these virtues. A child so instructed may for a time maintain a feeling of being uniquely wicked and unworthy in a well-ordered world of adults who never, or only rarely, fail to maintain the sanctioned rules and regulations.

During adolescence, however, the sharpened awareness of the boy and girl and their increasing exposure to the larger social life around them is likely to bring a new point of view on these questions. The transition will not be without strain. In coming to understand that all is not ideal in the adult world, and that there are discrepancies between pretensions and the actual situation, they often become concerned about their own families, sensitive and worried about family customs and patterns and ways of living which now appear to be peculiar, different, and embarrassing. As J. S. Plant has said, the adolescent may hold an image of *the* family, an ideal existing nowhere but in his own thinking, against which he contrasts *my* family, which lacks many of these ideal features and admired characteristics (9). The boy and girl, especially of foreign-born parents or of some other conspicuously minority group may want to conceal his family from his contemporaries as a social liability. If he actively dislikes his home life and resents traditional practices, his parents find it difficult to

understand such apparent disloyalty; they cannot readily accept the criticisms, sometimes brutally candid and seemingly lacking in any affection, which their sons and daughters sometimes pour out with unconcealed scorn and irritation.

Such overt behavior is distressing and unforgivable to the parents who cannot see that their adolescent boy acts and speaks in such manner just because he is so concerned about his family, is so dependent upon his parents, and so eager to have them appear better than they are. It is a reversal of the parent-child positions, since during childhood the parents usually have scolded, publicly criticized, and pushed and pulled their child, in the endeavor to make him appear more favorable to others; but when the youth undertakes to improve the practices of the family, his parents are inevitably bewildered and incapable of understanding what such atrocious conduct really means.

III. ATTITUDES TOWARD SELF AND SOCIETY

But the adolescent's distress arises not merely from the family situation. If he or she has grown up with the usual fanciful picture of society, so characteristic of the well-protected, middle-class child, then his exposure to the actual life of the outer world may be devastating. It may be difficult for the adult who has forgotten his or her adolescence to recall or realize the turmoil and confusion which sometimes occurs. What outcome is to be expected when an adolescent finds his romantic ideal of marriage impaired by the discovery of marital discord, divorce, and infidelity; when his vision of government as the wise guardian of social order is displaced by the picture of political chicane and graft and other aspects of machine administration; or when business is, in some quarters, disclosed as a hard and ungenerous struggle for the defeat of others, quite lacking in the glamour of the publicized success stories?

It is obvious that such revelations may, for some adolescents, be a profoundly disillusioning experience. The individual boy or girl, especially the boy, may react rather strongly to his disillusionment. He may suddenly repudiate many of his previous beliefs and ideals, scorn the church and all official religion, become hard-boiled and cynical and decide to play the adult game like the others. If he does follow this path, he may then be reproached by his elders for lack of idealism, often by the very people whose conduct has been most disillusioning. Other adolescents may respond to these disclosures of the actual social life by a burning ambition to remake the world, to reform society and clean up the mess—and then they are denounced

for joining youth movements and espousing subversive programs which threaten social order!

From early days of childhood, through the continual experience in the family and neighborhood and school, the child develops an image of himself, created partly as an acceptance or rejection of what parents and others say to him about himself (or what he has overheard) and partly as an imaginative picture of himself. This picture may be compensatory, showing himself as surmounting all obstacles and frustrations, achieving impossible deeds and otherwise playing the hero in his private world, or it may be an acceptance of his worthlessness, inadequacy, and badness (in the terms declared by his parents). For all children this image of the self may be many-sided—with many contradictions and inadequacies, and usually fantastically unreal. It is possible for children to develop an image of themselves as unmitigated villains or submissive, docile slaves and to feel that they are doomed to such roles all their lives.

The individual's image of himself at adolescence, whatever that image may be, is usually confronted with a variety of actual experiences which compel some revision. He may discover that other boys and girls are equally inadequate and lacking in the virtues he has failed to develop. Likewise, with increase in size and in his understanding of group relationships, he may find opportunities to do things he formerly felt were impossible. As noted in chapter i, changing size and the appearance of secondary sex characteristics (voice, beard, etc.) often bring a new orientation and for some boys a radical alteration in their status and their relationships with other boys. The old saying that youth has all the vocations indicates that the adolescent may feel he or she is capable of any activity or occupation, but when confronted with the actual demands or requirements of schools or jobs, this feeling of confident capacity may shrink to a modest endeavor to fill some small job, do some little task, win some slight acceptance and recognition in a specific endeavor.

Since our social life involves at some points a competitive struggle for power, prestige, or money, we frequently see an individual winning in this struggle over much more competent, able rivals, by sheer aggressive or ruthless drive or by impulsion. Some adolescents, sensing this, strive to emulate these powerful individuals by being themselves aggressively ruthless; others, lacking these qualities or being more submissive, seek security by attaching themselves to more powerful persons; while others withdraw from the struggle, finding refuge in some secure or noncompetitive activity.

Girls today are torn by the desire to realize their earlier image of themselves as women, concerned with children, homes, and a husband, and by the social and educational pressure to justify themselves in some socially recognized position. The masculine pattern of achievement, of proving one's adequacy and gaining a place or position in life by what one does, appeals more and more to women. One reason for this has already been suggested in the fact that many women are now finding their capacity for child bearing and rearing socially devaluated. This is especially the case among the more highly educated women, who usually have fewer children than women whose education is less advanced. Moreover, in many colleges there has been a subtle but powerful sentiment that marriage and child bearing are less desirable than intellectual and professional success. The resulting conflict may be a source of uneasiness, if not anxiety, for women who, by tradition if not by biological organization and functioning, have been concerned for recognition of themselves as persons—*who* they are, not *what* they achieve.

IV. OPPORTUNITIES FOR ADJUSTMENT

These efforts to come to terms with the "reality" of actual social life and to revise the image of the self may not be successful; in fact, as the figures on mental disorders show, many boys and girls, during the later years of adolescence and the early years of adult life, fail in these endeavors. It is the quiet, well-behaved, shut-in boy or girl who is more often the victim of these disturbing experiences, sometimes developing mental disorder. It may be the highly intelligent, sensitive youth who "breaks down" or commits suicide during later adolescence. Needless to say, these episodes are not to be glibly explained in terms of overwork, much study, or too limited interests. They are, rather, an outcome of cumulative life experiences, brought to a crisis through acute adolescent disturbances. In some of these cases the crisis is postponed; the individual boy or girl seemingly passes safely through adolescence, only to "crack" some years later in the twenties or thirties.

There are, of course, many more aspects of the process of growing up in our society, but the foregoing may serve to indicate some of the perplexities and frustrations facing adolescents; it has also indicated ways in which adults, parents, teachers, and others may fail in helping adolescents to meet their life tasks constructively. It is to be noted that during these years of readjustment and more or less painful growing up, teachers have a large opportunity to help adolescents, not by playing amateur psychiatrists and inviting confidences which they are often

incapable of handling wisely, but by exhibiting a friendly understanding and, above all, a respect for the man or woman who is struggling to emerge from the confused adolescent.

In discussing the problems of adolescents arising from family situations, it is not implied that all families are creating such problems; in a large proportion of families, a relatively effortless adjustment is achieved by the adolescent during the processes of becoming an adult.⁶ However, as noted in chapter i, it should be recognized that all adolescents have to face somewhat the same life tasks and have to meet greater or lesser problems of readjustment; some are able to meet these problems with greater adequacy and courage while others develop ways of living, feeling, and reacting which deviate too far from the socially approved norms. When such difficulties arise, we often tend to be blind to their wider significance. We are scarcely aware of how much the adolescent's resolution of his life tasks is capable of influencing our social order or of frustrating some of our major social goals. It seems clear that in many cases, as the adolescent revises his image of himself and "decides" to be cynical and hard-boiled, or fantastically idealistic, his future conduct as a citizen is thereby profoundly influenced. The socially significant fact is that youth in later adolescence represents a fund of energy, idealism, and altruism which is among the most precious of all human resources. Too often these energies go to waste or, what is worse, are replaced by an adult complacency and cynical indifference which indicate failure for the individual himself and often for his children in the generation to follow.

It may be hoped that schools and colleges will eventually take more responsibility, as the agents of social change, for helping parents to accept new ideas and practices along with their children and for actively assisting parents to reduce the present conflicts within the family. Both the parents and their children suffer from such conflicts; and the effect upon the adolescent's own marriage and later family life may be disastrous. Cannot the schools, which are ready to supplement family teachings in academic subjects, also help the adolescent to find a more wholesome, and more humanly constructive approach

⁶In a publication of the American Youth Commission, Folsom has pointed out, "No one knows whether adjustment to family life is better or worse than it was a hundred years ago; we do know that it is a more prominent center of problems. But even if it could be shown by some absolute scale of measurement that family life has improved, the home of today would still be a center of more problems than yesterday's home, would require more thinking, and would give rise to more worry simply because people now can do and dare do something about it" (5: 8).

to problems of human relationships? If we are genuinely concerned about the home and the family as basic elements in the social order, we should in every way encourage the schools and colleges to make use of their opportunity to uphold the family through appropriate training of the adolescent.

REFERENCES

1. BENEDICT, RUTH. "Continuities and Discontinuities in Cultural Conditioning," *Psychiatry*, I (May, 1938), 161-67.
2. BLOS, PETER. *The Adolescent Personality*. New York: D. Appleton-Century Co., 1941. Pp. 517.
3. BURGESS, E. W., and COTTRELL, L. S. *Predicting Success or Failure in Marriage*. New York: Prentice-Hall, 1939. Pp. x + 472.
4. DOSHAY, L. J. *The Boy Sex-Offender and His Later Career*. New York: Grune & Stratton, 1943. Pp. vi + 206.
5. FOLSOM, J. K. *Youth, Family, and Education*. Washington: American Council on Education, 1941. Pp. xv + 299.
6. FRANK, L. K. "Opportunities in a Program of Education for Marriage and Family Life," *Mental Hygiene*, XXIV (October, 1940), 578-94.
7. HORNEY, KAREN. *The Neurotic Personality of Our Time*. New York: W. W. Norton & Co., 1937. Pp. 299.
8. MARTIN, ALEXANDER REID. "A Study of Parental Attitudes and Their Influence upon Personality Development," *Education*, LXIII (June, 1943), 596-608.
9. PLANT, J. S. *Personality and the Culture Pattern*. New York: Commonwealth Fund, 1937. Pp. x + 432.
10. TERMAN, L. M., et al. *Psychological Factors in Marital Happiness*. New York: McGraw-Hill Co., Inc., 1938. Pp. xiv + 474.
11. WILLOUGHBY, R. R. *Sexuality in the Second Decade*. Monographs of the Society for Research in Child Development, Vol. II, No. 3. Washington: National Research Council, 1937. Pp. iv + 57.
12. ZACHRY, CAROLINE. "Emotional Problems of Adolescence," *Bulletin of the Menninger Clinic*, IV (May, 1940), 63-73.

CHAPTER XIV

THE DEVELOPMENT OF INTEREST IN VOCATIONS

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One of the significant aspects of the adolescent period is the emergence and development of vocational interests. It is characteristic of children that they give little thought to the serious problem of earning a living and, in fact, have little orientation to the world of work. It is equally characteristic of adults that they of necessity know something about at least one serious occupation. The transition is accompanied by complex changes in social personality, in group status, and in feelings toward self.

Adjustment to the occupational world presents more problems today than in an earlier and less industrialized culture. As this is being written, the transition to a wartime economy is a temporary, disturbing factor. Although not our main consideration, it is relevant to this discussion. Manpower requirements of the war have eased some of the occupational problems of youth and immensely complicated others. Specialization has at least temporarily increased. Striking changes have also occurred in the occupational status of women. The return to peacetime occupations will bring new and rapidly changing conditions which will make heavy demands upon our resources for the vocational counseling of youth.

The young person of today usually does not experience a quick or smooth initiation into any particular field of work by virtue of family tradition. He has theoretical "freedom of choice," in the face of a baffling external situation and a general social expectation that he will "rise in the world." During a long period of education he has an op-

portunity, through formal schooling as well as informal observation, to become at least vaguely aware of his abilities, preferences, and ambitions. When the time comes for a vocational tryout, he discovers that he has habits, abilities, and desires of an individual sort which markedly affect his reactions to a given occupation. On the other hand, he is ignorant of the fundamental facts about most occupations, doesn't know which one he is best fitted for and doesn't know the essential facts about his own talents and weaknesses in comparison with those of other persons.

Furthermore, it appears that occupations themselves are characterized, perhaps to an increasing extent, by changing demands which contribute to the insecurity of the young person. Jobs change; some become obsolete; their requirements change.¹ The young person often seeks a job better than that which is ordinary in his social and economic background. Without much knowledge of the hazards involved, he seeks the job which commands respect and which seems likely to yield relatively high financial returns. His vocational preferences are in part a response to cultural pressure, at home and at school, which encourage him to climb upward. The world of jobs and the processes of job orientation are disorderly and confused. The young person seeks to impose order upon the situation, at least as he views it subjectively.

I. THE NATURE OF VOCATIONAL INTERESTS

The term "vocational interests" is used to indicate the sum total of all personality characteristics, other than abilities, which are significant for vocational satisfaction. They include reactions, habits, and patterns of emotional response based upon abilities, ambition, and the general environmental circumstances mentioned above. Vocational interests, like traits, should not be confused with any of their specific indicators or manifestations.² It appears that the term "interests" has been variously used, sometimes to indicate specific reactions, such as a stated liking for bookkeeping. It must be admitted that a liking for a specific activity is a vocational interest if the activity constitutes

¹ Modern developments in shipbuilding and in aircraft manufacturing furnish examples of this sort of change. The depression which existed in the ten years prior to World War II provides a different view of the instability of jobs.

² For example, the statement "I would like to be a lawyer," is a specific indicator and not the whole of any well-developed pattern of interests such as may characterize successful lawyers.

an occupation or an essential part thereof. But experience has shown that interests of the sort which can be approached only through study of a *variety of indicators* are the ones characterized by stability and vocational importance. An extensive array of published evidence shows that interests so measured are organized, stable, and in nature allied with practical motives. Such interests are not dependent upon specific occupational experience for their development. They undoubtedly are based upon some aspects of experience, but are often found to be strongly developed and stable prior to entrance into any occupation.

It is here implied that the vocational preferences of young persons consist, in part, of personality traits or habitual modes of response, of which the individual may be only partly aware. Sometimes the necessary awareness is achieved only painfully, through try-outs in various jobs. Such a process is so slow as to be fundamentally frustrating, especially to those with undiscovered talents for the rarer jobs or abilities and preferences best suited to professional work which requires a long period of training.

A certain inner security, and perhaps some status among his fellows, is achieved by the adolescent merely by making a verbal statement of occupational choice and advertising the fact. This is especially true in the case of those who are sensitive to the prestige aspects of occupations, and who have some need for achievement or recognition which can be satisfied by identifying themselves with a given field of work. Sometimes the "choice" is only verbal, to impress others. But once a choice is made, it may furnish an impetus for reading, discussing, observing, and otherwise learning about the occupation. In some individuals this occurs at an early age.

It is certainly true that the development of vocational interests is dependent upon other aspects of maturation and learning. One of these is intelligence, since the learning process is involved to a considerable extent in satisfactory vocational adjustment. There is an obvious relationship to age; particularly at the high-school level the necessity of selecting courses, sometimes the need to earn money, and the nearness of "getting a job," put pressure on youth to make vocational choices. Various environmental factors are important, since the individual assimilates from his surroundings the fundamental value systems which are at the basis of vocational interests.³

³The foregoing theoretical account of vocational interest development is elaborated in reference (16).

II. THE MEASUREMENT OF VOCATIONAL INTERESTS

Vocational interests are indicated to some extent by any one of several methods, including verbal statements of vocational choice, results of interest inventories, reactions to work projects, persistence in programs of training, and actual entrance into occupations. While none of these is a perfect indicator, the present trend seems to indicate the superiority of the interest inventory for the prediction of vocational satisfaction.

The content and organization of vocational interest inventories may be illustrated by Strong's *Vocational Interest Blank for Men*. This test contains four hundred items, arranged under eight headings, namely: occupations, school subjects, amusements, activities, peculiarities of people, order of preference among activities, comparison of interests between two items, and rating of present abilities and characteristics. The person taking the test marks each item to indicate liking, indifference, disliking, preferences, or habitual modes of response, according to the instructions. Previous research has shown that men in a given occupation respond to these items in a characteristic manner which is different from that of men in other occupational groups. By tabulating such responses, scoring keys have been constructed in order to permit a summary of a given person's responses in comparison with those of various occupational groups.

The results are intended to indicate to the person tested the extent to which he has the interests characteristic of successful men in various occupational groups. Norms permit expressing the results in the form of raw scores, standard scores, or letter ratings. The latter are most commonly used to explain the results to laymen. In brief, a letter rating of "A" for a given occupation means "Yes, you do have the interests of successful men in that occupation." The rating of "C" means "No, you do not have those interests." The "B" ratings are intermediate, and indicate partial development of those interests.⁴

In the beginning, the inventory was planned and constructed for

⁴At the present time there are thirty-eight scoring keys available for use with Strong's *Vocational Interest Blank for Men*. These are limited for the most part to professions and skilled trades. At first it may seem that this limitation constitutes a serious defect of the instrument, but since these occupations are the ones requiring long periods of preparation, they are evidently the ones for which appropriate selection in relation to one's interests is most needed. The use of so many scoring keys is laborious and expensive, hence there has been provided an abbreviated scoring procedure in which a smaller number of keys is employed. In view of the high intercorrelations among certain scales the use of all thirty-eight keys is not always necessary.

use with college students and older adults. The desirability of providing guidance for younger individuals has led increasingly to attempts to employ such inventories in studies of younger persons, notably high-school students. In recent years evidence has been provided, showing that the vocational interest inventory is more useful in studying these younger groups than was formerly supposed.

III. PRIOR STUDIES

The studies of vocational interests of adolescents, as well as of all other groups, have been summarized in Fryer's book (34) dealing with investigations up to the year 1930. The work of this earlier period served to clarify concepts and to indicate more precisely the multitude of unsolved problems in the measurement of interests. But it also furnished a basis for a general belief that the vocational interests of young people are unstable and unsubstantial. This view rests in part upon inadequate data obtained by use of a variety of questionnaire techniques, many of which were superficial and unreliable. It rests in part upon emphasis on data from children in earlier adolescence, to the neglect of the transitional phase. It rests in part upon the neglect of individual differences in interest development.

In the last decade many studies of vocational interests have appeared. There now exist many semistandardized interest tests, and a few well-standardized vocational inventories. The latter have proved to be reliable and useful in predicting vocational choices, vocational success in special areas, educational choices, and educational success.⁵ Strong (80) has also shown that the inventory is useful in predicting entrance into occupations, as well as persistence in occupations. The difficulties and limitations of prediction of vocational success are indicated by the well-known studies of Thorndike, Lorge, and others.⁶

Most of the investigations of interests have dealt with college students and older adults. However, a number of more recent studies have been concerned directly with the vocational interests of high-school students. Carter and others⁷ have shown that scores on Strong's *Vocational Interest Blank* reveal varied patterns of interests among high-school boys and girls and that such patterns of interests are often

⁵ See references 9, 51, 77, 84, 89, and 92 for data on reliability; references 17 and 80 for evidence on the prediction of vocational choices, references 43 and 79 concerning vocational success, references 31, 36, 93, 94, and 99 concerning educational choices, and references 20, 26, 27, 29, 45, and 46 concerning educational success.

⁶ See references 55, 56, 86, and 87.

⁷ See references 11, 12, 15, 16, 84, and 85.

remarkably persistent throughout the school years.⁸ Within this age range such interest scores show low correlations with age, but a significant pattern of correlations with intelligence. A study of twins (12) has furnished the inference that interest patterns are at least indirectly dependent upon stable, possibly inherited, factors. Relationships, in individual cases, to various aspects of personality have been indicated by case studies.

A recent large scale study led Laleger (51) to conclusions unfavorable to the use of interest tests in guidance. The *Strong Vocational Interest Blank for Women* and the *Manson Occupational Blank for Women* were applied to 703 girls in the eleventh grade. Some of the girls received no "A" ratings, while some others received as many as ten "A" ratings from one blank alone, and the average girl received 2.6 "A" ratings on the Strong blank, 3.1 "A" ratings on the Manson blank. This was regarded as making the scores hard to interpret. The two tests did not agree well, showing for the most part very low correlations between cognate scales from the two blanks. Neither blank selected very well the girls who stated their intention of entering a given occupation. Little correlation of interest scores with intelligence was found, but the pattern of correlations was as it should be according to well-known studies⁹ of the intellectual requirements of occupations. The author concluded that the tests have very limited validity and perform too limited a service to justify the cost.

The writer regards as highly desirable all such studies which point out the limitations of existing interest scales. It is to be hoped that the tests will not be oversold and misused. Nevertheless, Laleger seems unduly pessimistic. The disagreement of two tests does not neces-

⁸ The reliability of interest scores for high-school students was first shown conclusively by Taylor (85). Further evidence of the high reliability of interest scores of high-school students is provided by Laleger (51). Investigations by Canning (11), and by Taylor (85), using the retest method, have shown that the vocational interests of high-school boys and girls as measured by the Strong blanks are almost but not quite as stable over a period of years as are the interests of college men. Carter (17) showed that the interest scores obtained by high-school students tend to be low when arbitrarily selected occupational keys are used, and high when the scoring keys are appropriate to stated choices of occupations. Further investigations (15, 84) using case study material clearly indicated that interest test results presented in the form of profiles are valid and useful. That is, the profiles present a picture of vocational preferences which is consistent with facts drawn from case studies, and apparently practical and useful in the counseling situation.

⁹ For detailed evidence as to the intellectual level of various occupational groups see references 3, 5, 10, 19, 33, and 35.

sarily demand the conclusion that both are invalid. An earlier study by Berman *et al.* (7) indicated that the Strong blank for men is more effective than the Manson test. One may infer that the Strong blank for women is also more effective, in view of the extension by Strong of the same principles to the women's blank. When the various high scores on such a test as Strong's are put together to form a pattern, and examined from a clinical point of view as recommended by Darley and others (24, 25), the existence of several high scores (i.e., "A" ratings on more than one category of interest) may be of value in counseling. The test is probably correct in showing that the average person has the interests appropriate to more than one occupational group. From Laleger's study one gets a very clear impression that these interest inventories cannot be used mechanically or routinely in counseling. But other workers¹⁰ find the inventories appropriate and useful aids in the counseling situation.

IV. VOCATIONAL INTEREST PROFILES

In the Adolescent Growth Study at the University of California, the results of interest testing have been presented and summarized in the form of profiles of standard scores, along with some other available indications of ability and personality traits. These studies of limited samplings, tested and retested several times, provide data to supplement the indications of large-scale, cross-sectional studies.

The figures presented in the following pages indicate the results of successive tests, summarizing the findings by means of profiles of standard scores superimposed upon the same base line. Thus, they furnish a visual indication of highest and lowest scores and of primary interest patterns. Since it is not possible here to show all of the individual profiles, a selection has been made in order to illustrate some of the principal characteristics of patterns based on repeated tests. The first four figures indicate results obtained with girls, and the second four show similar results obtained with boys.¹¹

Each chart furnishes an indication of the scores obtained by one person when the interest blank was scored using several occupational keys. The standard score formula employed was such as to make the mean score fifty and the standard deviation of scores ten units for each occupational scale. Hence, scores below fifty are low scores in the sense that

¹⁰ See references 7, 15, 20, 24, 25, 31, 45, 68, 69, 80, 84, 91, 93, and 94.

¹¹ Fifty-seven high-school girls were in the sampling tested in the eleventh grade, and retested in the twelfth grade, using the Strong *Vocational Interest Blank for Women*.

they are below the average of the high-school group tested. This treatment implies that the individual's interests are to be compared with norms based upon the high-school group. The method also eliminates differences in scores which would result from inequalities of the scoring keys and renders scores on the several occupational scales directly comparable. From these profiles the reader will see that a single individual usually has more than one high score, indicating that the person has the interests of more than one occupational group. Sometimes such groups are related, but it also happens occasionally that an individual has at the same time interests of two groups which are usually regarded as very dissimilar. There can be and often is inconsistency in interests. Variety of interests, or versatility, is however more common than clear-cut inconsistency.

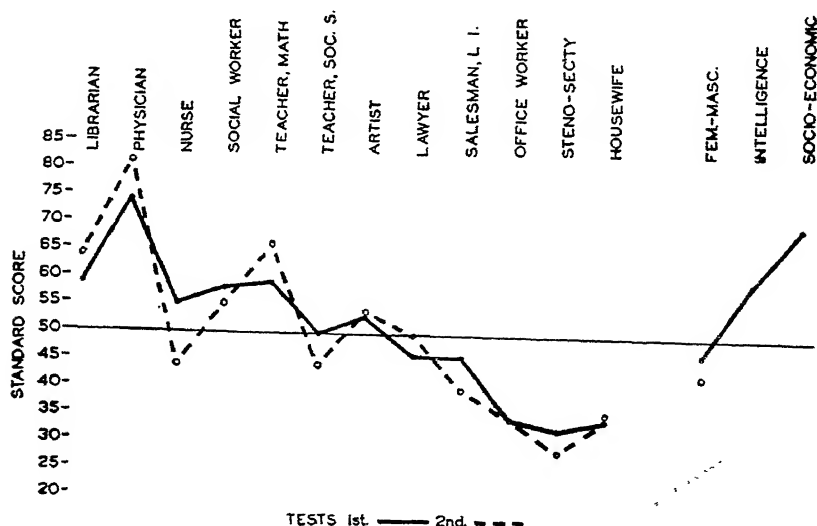


FIG. 1.—Standard score profile for high-school girl showing scores on twelve diagnostic vocational interest scales and on three other variables.

Figure 1 reveals the interest profiles, in successive years, of a girl who retained the same primary interest pattern in grades eleven and twelve. There is some evidence of greater discrimination in the later test, shown by accentuation of some points on the profile. The girl has interests characteristic of women physicians and also interests like those of teachers of mathematics. Bearing in mind her high intelligence and high socio-economic status, the profile of interest scores for this

girl may appear both meaningful and appropriate. A staff member who knows the girl well reports that she had manifested various interests, including those of a business woman, those of a mathematics teacher, and those of a doctor. The counselor pointed out, however, that the girl's personality had been influenced by her affectation of masculine behavior, partly attributed to unsuccessful feminine appeal. The interest test, of course, cannot solve the girl's personal problems, but it provides information which may be useful when considered in relation to other things that the counselor knows about her.

Figure 2 shows the two profiles for a girl whose highest and second-highest scores were reversed in the two testings. In the eleventh grade her highest score was for the interests of office workers; her second-highest score (neglecting stenographer-secretary, which is highly corre-

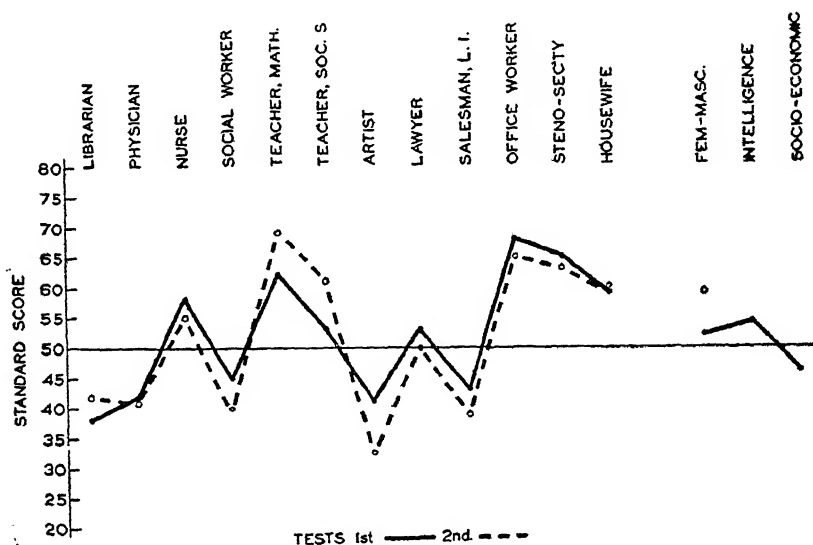


FIG. 2.—Standard score profile for high-school girl showing scores on twelve diagnostic vocational interest scales and on three other variables.

lated with office-worker) was for teacher of mathematics. In the twelfth grade the score for teacher was highest, that for office-worker second. The girl's intelligence level is appropriate for either of these occupations. Also, these occupations are open and practical for persons slightly below the average income group. The staff member best acquainted with the girl commented that she would be fitted for a job as office worker,

that she is not brilliant, but "would do a good, plodding job in whatever occupation she finds herself."¹²

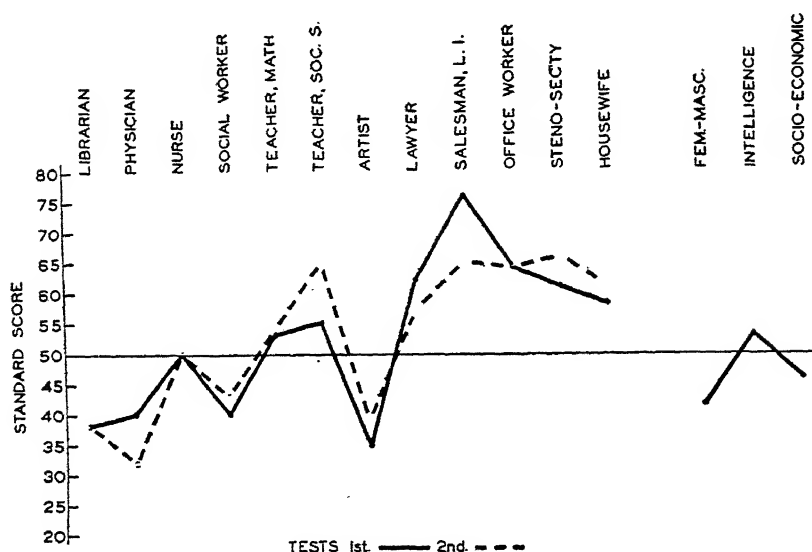


FIG. 3.—Standard score profile for high-school girl showing scores on twelve diagnostic vocational interest scales and on three other variables.

Figure 3 indicates the similarity of the profiles in a case where the highest score on the second test is different from that on the first test. In the judgment of the writer, the change in the second involves, for this individual, a more appropriate organization of interests.

Figure 4 shows the two profiles for one of the few girls whose interests apparently changed markedly between the eleventh and twelfth grades. The artist-plus-librarian interest pattern is one of the frequently occurring combinations among high-school girls, especially among those whose intelligence is about average. The interests of teachers were most marked on this girl's first tests; the artist-librarian pattern (which is perhaps less incompatible with her intelligence level) appears dominant at the time of the second test.

In the same study, sixty-four high-school boys were tested in the tenth grade and retested in grades eleven and twelve, using the *Strong Vocational Interest Blank for Men*. The stability of interest scores and

¹² In every instance the comments by the counselor were made without knowledge of the results of the test.

of primary interest patterns is indicated by presenting three profiles, one for each test, superimposed on the same base line.

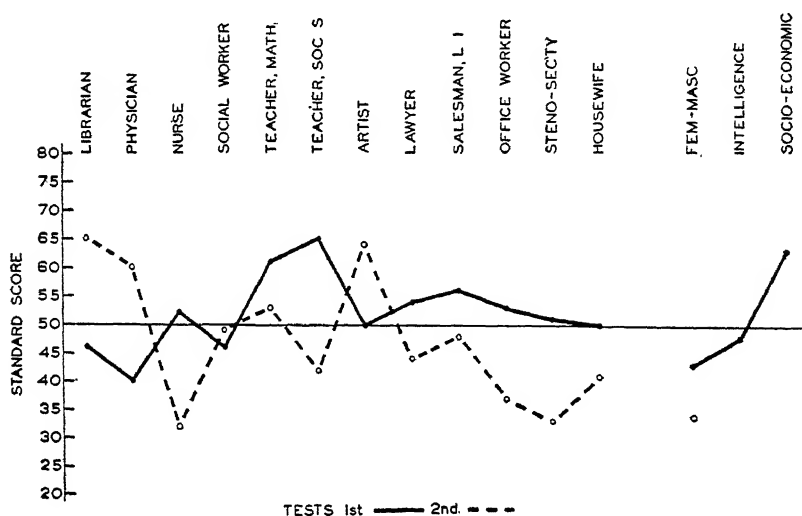


FIG. 4.—Standard score profile for high-school girl showing scores on twelve diagnostic vocational interest scales and on three other variables.

Figure 5 shows the interest profiles for a boy whose primary interest pattern remained much the same throughout the high-school years. The interests characteristic of life-insurance salesmen persist, while at the same time the interests characteristic of office-workers increase, and in the third test interests like those of accountants appear. The common interests of high-school boys in science are lacking—quite appropriately in this case.

Figure 6 shows similar standard score profiles for the three tests for a boy of unusually high intelligence. A striking consistency of interests is seen. His primary interest pattern is like that of chemists. The counselor stated that he was unimaginative and immature in the high-school years, but that he has ability. He was not socially adaptable, but was "a good Boy Scout." His family was ambitious for him. His genuine abilities in science were revealed later in college, when he completed a successful major in chemistry and was elected to the chemistry honor society.

Figure 7 shows the three profiles for a boy whose interests undergo a cumulative change. A similarity of the profiles is seen, but interests characteristic of lawyers are gradually decreasing, while those measured by the accountant and office-worker scales are on the increase.

This seems to be a very practical development for a boy whose IQ is only slightly above average. The counselor noted that he "comes from

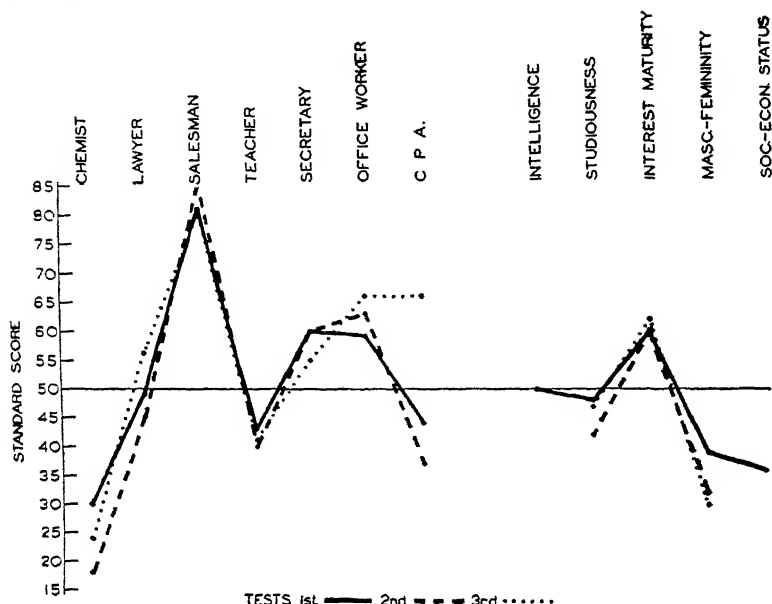


FIG. 5.—Standard score profile for high-school boy showing scores on seven diagnostic vocational interest scales and on five other variables.

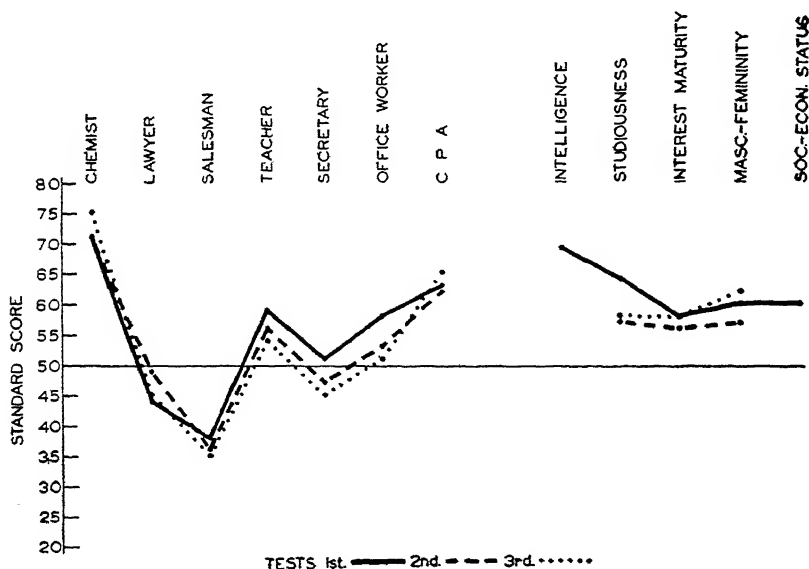


FIG. 6.—Standard score profile for high-school boy showing scores on seven diagnostic vocational interest scales and on five other variables.

a good family, with a religious and somewhat conservative background." He was popular and prominent in student affairs in high school. The counselor said she would expect him to show business or administrative ability rather than scientific ability. The boy is an athlete, but not outstanding intellectually.

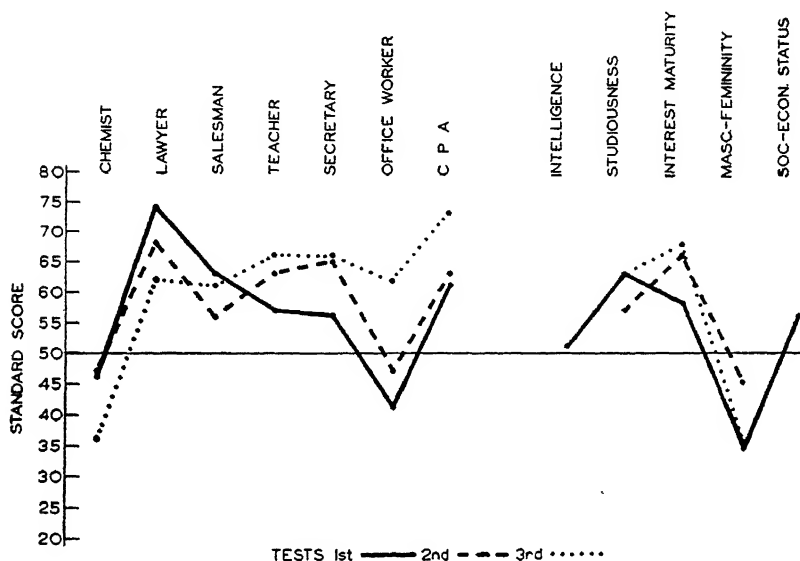


FIG. 7.—Standard score profile for high-school boy showing scores on seven diagnostic vocational interest scales and on five other variables.

Figure 8 shows the profiles for a boy who seemed somewhat confused in his early interests. His first profile was not particularly suitable, since he lacks the social ability one considers important for the work of a YMCA secretary. His second interest profile, obtained in the eleventh grade, is certainly not appropriate since he lacks the ability to become a competent lawyer and his personality is not that of a successful salesman of life insurance, except possibly for the traits of stubbornness and persistence. His third profile shows a high score for the interests of teachers. He may find success in teaching, because he is studious as well as persistent. In intelligence, he is a little above the average of his group, which in turn is slightly above the mean of the general population. The counselor noted that the boy wants to be a teacher, that some of his advisors feel he will be very successful at it, and that he has been successful in college work in preparation for teaching.

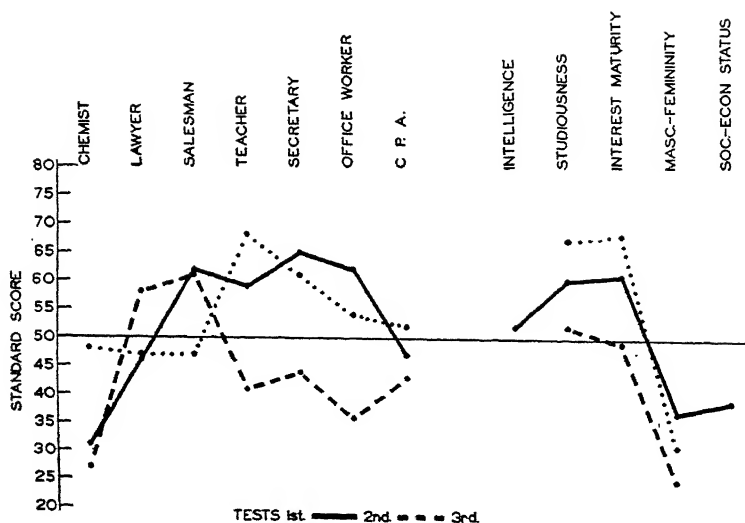


FIG. 8.—Standard score profile for high-school boy showing scores on seven diagnostic vocational interest scales and on five other variables.

V. INTERPRETATIONS OF THE PROFILES

For an adolescent, a high score on a scale of the *Strong Vocational Interest Blank* does not necessarily mean that his interests in that category are strongly developed and stable. It means that some of those interests are at times dominant in his thinking or behavior. It indicates a strong probability, not a certainty, that he will have the same interests a year later. During the high-school years and the years immediately following, there is little evidence of systematic increase or decrease of scores. The pattern of interests undergoes some change, but with fewer systematic changes than might be expected. It may be supposed that a number of young people remain confused and their motivations unintegrated as they grow older. Others persist in inappropriate patterns of interests. Such changes as occur, involving the organization of interests, are dependent upon experience which reaches the level of awareness, and upon the application of learning, and are not merely the result of chronological age changes.

Although the limitations of profiles have been pointed out by Hoppock (44) and others, it would appear that this method of looking at interests affords a serviceable approach to the study of individual characteristics, providing the test data can be used in the context of a clinical interpretation rather than as a statistical routine.

The relationship of these data to later occupational choices is not

known, although some degree of relation may be inferred. Studies such as those of Carter and others (15, 17) indicate that interest scores check satisfactorily with verbal statements of vocational choice. Furthermore, studies by Hartson (41) and others have indicated a marked agreement between vocational choices as reported in school, later curricular choices in college, and later entrance into occupations.

VI. THE CONTROL OF VOCATIONAL CHOICES

The vocational ambitions of young people and of unemployed people have often been shown to be impractical. They are often relatively independent of the general demand, of local opportunity, and of abilities and other assets. They are evidently persistent, even when opposed by a variety of external influences. The character of such vocational ambitions is obviously influenced by the relative social prestige of different occupations.¹³ Young people wish to climb, to secure higher status, to receive higher rewards. Their hopes are often out of line with reasonable expectations. They are hardly to be censured for this. Their attitudes have been assimilated from the surrounding environment, which bristles with expectations of climbing, of beginning at the bottom and working up, etc. There is, however, very little evidence in our contemporary economy, in peace time, to justify a belief in any widespread "upward mobility" with regard to occupations.¹⁴

In the prevailing system of *laissez-faire*, ignorance and unreasonable social expectation persist and often control efforts toward job orientation, to the obvious disadvantage of many of the young persons themselves. Some ground for optimism in the handling of this problem lies in the studies¹⁵ of attempts to guide or control interests. These range from general personnel services and the provision of information to experimental investigations of the effects of particular stimuli upon vocational motives. The former studies indicate that giving of relevant information is often effective with high-school students in making their interests more realistic. The latter show that logic-tight compartments may prevail, and that the effect of instruction is often highly specific. An inner personal life may persist upon one plane generally, while permitting adjustment to reality in specific matters. Altogether, recent studies do indicate that vocational choices, and to some

¹³ See references 28, 40, 52, 58, 70, 71, 72, and 97 for details concerning the "prestige hierarchy" of occupations.

¹⁴ Marked evidence of vertical occupational mobility is evident in today's war industries. This may well be a temporary condition.

¹⁵ See references 4, 6, 8, 21, 48, 59, 64, 65, 83, and 90.

extent vocational drives, can be influenced by education. A foundation is being laid to indicate the nature of such education and the procedures which may be effective in administering it.

VII. INDIVIDUAL DIFFERENCES IN INTERESTS

The basic structure of modern vocational interest inventories depends upon the existence of differences in interests among occupational groups. This implies that individual differences are important and useful for occupational guidance of individuals. It does not assume *a priori* that single age groups are homogeneous in interests, or that interest patterns can be explained fully in terms of any one factor such as age, sex, intelligence, physiological maturity, social class, or educational status. It implies rather that such factors, as they may relate to the individual pattern of interests, must be investigated empirically.

The most comprehensive study of age differences in vocational interests is that by Strong (75). The research was concerned with adults, aged twenty to sixty, hence the details of description do not apply to the adolescent phase, but the evidence provided some relevant general principles. The change with age is gradual, from twenty to sixty, and is greatest in the earlier years. Older men have just as many likes and dislikes as younger men, but the pattern is different. The differences are often quite understandable; thus, older men tend not to like activities involving danger or strenuous exertion. Some interests, such as those expressed by ministers, teachers, and psychologists increase with age. Other interests, such as those of engineers and salesmen, decrease with age. The general outcomes of the study are such as to show that the interests of adults are not explainable primarily in terms of age. Carter's study (12), of junior and senior high school pupils, reported correlations which were close to zero for most of the scales of the Strong blank. Such evidence, along with retest data from the California study (16, 84) lead to the suggestion that the essential changes in interest scores with age are complex, highly individual, and organizational.

The correlations of interest test scores with intelligence¹⁶ are likewise small, varying in Carter's study (12) from about $-.40$ (vacuum cleaner salesman) to about $+.36$ (chemist, psychologist). Further studies of high-school groups in the present series indicate that the vocational interests of brighter children tend to develop earlier than those of duller children, and are often better suited to individual circumstances. The bright person is more often well adjusted vocationally and, if undecided, appears characteristically to be troubled by a par-

¹⁶ See references 3, 5, 10, 19, 33, 35, 53, 54, 57, and 96.

ticular type of problem, namely, choice among several well-developed interests. The less-intelligent person much more often experiences indecision based upon the absence of well-developed interests or upon the development of interests which are totally inappropriate to the individual's abilities or opportunities. The bright person has the advantage that the occupations open to him are often more satisfying. The less-intelligent person has the advantage that the great majority of occupations suited to his abilities are such as to require little training, and consequently such as to permit extensive use of vocational try-outs as a method of improving vocational orientation.

Little is known concerning the effects of physiological maturing upon the development of vocational interests as scientifically measured. Evidences from sex differences and from age differences provide a basis for raising hypotheses. Of course, as children grow older they become less interested in, for example, playing marbles, and more interested in dancing and in earning money. But the occupational significance of the changes can only be inferred, and conclusions are necessarily speculative. It does seem likely that getting physically bigger is associated with increase in social pressure toward vocational orientation, and that sexual maturation leads to thoughts about achieving financial independence. However, it is undoubtedly true that well-developed vocational interests are present in some adolescents and lacking in others, irrespective of their relative physiological maturity.

The effects of social class¹⁷ upon vocational interests are likewise difficult to work out scientifically. One may infer that the vocational outlook is different among various social and economic classes, but the prestige hierarchy of vocations is regarded in much the same manner by persons in various classes. Under present conditions the desire to enter the professions is much more often realistic when held by privileged persons, than when held by those in the lower social and economic groups. Children in the latter groups are much less interested in the occupations of their fathers.

REFERENCES

1. ALTENEDEK, L. E. "The Value of Intelligence, Personality, and Vocational Interest Tests in a Guidance Program," *Journal of Educational Psychology*, XXXI (1940), 449-59.
2. ANDERSON, W. A. "Some Social Factors Associated with the Vocational Choices of College Men," *Journal of Educational Sociology*, VI (1932), 100-13.

¹⁷ See references 2, 20, and 50.

3. BARR, F. E. A. "A Scale for Measuring Mental Ability in Vocations, and Some Aspects of Its Applications." Unpublished Master's thesis, Stanford University, 1918.
4. BATEMAN, R. M., and REMMERS, H. H. "Attitudes of High-School Freshmen toward Occupations of Their Choice before and after Studying the Occupations by Means of a Career Book," *Journal of Educational Psychology*, XXX (1939), 657-66.
5. BECKHAM, A. S. "Minimum Intelligence Levels for Several Occupations," *Personnel Journal*, IX (1930), 309-13.
6. BELL, HOWARD M. *Matching Youth and Jobs: A Study of Occupational Adjustment*. Washington: American Council on Education, 1940. Pp. 277.
7. BERMAN, I. R.; DARLEY, J. G.; and PATERSON, D. G. "Vocational Interest Scales," *Bulletin*, Employment Stabilization Research Institute, University of Minnesota, III (1934), 215-45.
8. BUNTING, J. R. "Counselling Alters Pupils' Choice," *Occupations*, XVIII (1939), 174-76.
9. BURNHAM, P. S. "Stability of Interests," *School and Society*, LV (1942), 332-35.
10. BYRNS, R. "Relation of Vocational Choice to Mental Ability and Occupational Opportunity," *School Review*, XLVII (1939), 101-9.
11. CANNING, L.; TAYLOR, K. VAN F.; and CARTER, H. D. "Permanence of Vocational Interests of High-School Boys," *Journal of Educational Psychology*, XXXII (1941), 481-94.
12. CARTER, H. D. "Twin Similarities in Occupational Interests," *Journal of Educational Psychology*, XXIII (1932), 641-55.
13. CARTER, H. D., and STRONG, E. K., JR. "Sex Differences in Occupational Interests of High-School Students," *Personnel Journal*, XII (1933), 166-75.
14. CARTER, H. D.; PYLES, M. K.; and BRETNALL, E. P. "A Comparative Study of Factors in Vocational Interest Scores of High-School Boys," *Journal of Educational Psychology*, XXVI (1935), 81-98.
15. CARTER, H. D., and JONES, M. C. "Vocational Attitude Patterns in High-School Students," *Journal of Educational Psychology*, XXIX (1938), 321-34.
16. CARTER, H. D. "The Development of Vocational Attitudes," *Journal of Consulting Psychology*, IV (1940), 185-91.
17. CARTER, H. D.; TAYLOR, K. VAN F.; and CANNING, L. B. "Vocational Choices and Interest Test Scores of High-School Students," *Journal of Psychology*, XI (1941), 297-306.
18. CAUDILL, G. *Vocational Choices of College Students*. Kentucky Personnel Bulletin, 1937, No. 19.
19. CLARK, C. D., and GIST, N. P. "Intelligence as a Factor in Occupational Choice," *American Sociology Review*, III (1938), 683-94.
20. CONGDON, N. A. "A Study of Cleeton's Vocational Interest Inventory," *Occupations*, XVIII (1940), 347-52.
21. CRAWFORD, A. B., and CLEMENT, S. H. *The Choice of an Occupation*. New Haven, Connecticut: Department of Personnel Study, Yale University, 1932.

22. CRISSY, W. J. E., and DANIEL, W. J. "Vocational Interest Factors in Women," *Journal of Applied Psychology*, XXIII (1939), 488-94.
23. DARLEY, J. G. "A Preliminary Study of Relations between Attitude, Adjustment, and Vocational Interest Tests," *Journal of Educational Psychology*, XXIX (1938), 467-73.
24. ———. "Counseling on the Basis of Interest Measurement," *Educational and Psychological Measurement*, I (1941), 35-42.
25. ———. *Clinical Aspects and Interpretation of the Strong Vocational Interest Blank*. New York: The Psychological Corporation, 1941, 72 pp.
26. DIMMICK, G. B. "Interest Correlates of Superior and Inferior Achievement in General Psychology," *Journal of Educational Psychology*, XXVII (1936), 278-83.
27. DUFFY, E., and CRISSY, W. J. E. "Evaluative Attitudes as Related to Vocational Interests and Academic Achievement," *Journal of Abnormal and Social Psychology*, XXXV (1940), 226-45.
28. DUNCAN, H. G., and DUNCAN, W. L. "Attitudes of College Students toward Professions," *Journal of Educational Sociology*, IX (1935), 200-204.
29. DUNLAP, J. W. "Preferences as Indicators of Specific Academic Achievement," *Journal of Educational Psychology*, XXVI (1935), 411-15.
30. DYER, J. R. "Sources and Permanence of Vocational Interests of College Men," *Journal of Applied Psychology*, XVI (1932), 233-40.
31. ESTES, S. G., and HORN, D. "Interest Patterns as Related to Fields of Concentration among Engineering Students," *Journal of Psychology*, VII (1939), 29-36.
32. FINCH, F. H., and ODOROFF, M. E. "Sex Differences in Vocational Interests," *Journal of Educational Psychology*, XXX (1939), 151-56.
33. FRYER, D. "Occupational Intelligence Standards," *School and Society*, XVI (1933), 273-77.
34. ———. *The Measurement of Interests*. New York: Henry Holt & Co., 1931. Pp. 488.
35. FRYER, D., and SPARLING, E. J. "Intelligence and Occupational Adjustment," *Occupations*, XII (1934), 55-63.
36. GARRETSON, O. K. *Relationships between Expressed Preferences and Curricular Abilities of Ninth-Grade Boys*. Teachers College Contributions to Education No. 396. New York: Teachers College: Columbia University, 1930. Pp. 77.
37. GILGER, G. A., JR. "Declaration of Vocational Interest," *Occupations*, XX (1942), 276-79.
38. GORDON, H. C., and HERKNESS, W. W., JR. "Do Vocational Interest Questionnaires Yield Consistent Results?" *Occupations*, XX (1942), 424-29.
39. HARPER, B. P., and DUNLAP, J. W. "Derivation and Application of a Unit Scoring System for the Strong Vocational Interest Blank for Women," *Psychometrika*, VII (1942), 289-95.
40. HARTMANN, G. W. "The Prestige of Occupations: A Comparison of Educational Occupations and Others," *Personnel Journal*, XIII (1934), 144-52.

41. HARTSON, L. D. "Vocational Choices—before and after College," *Occupations*, XVI (1937), 138-42.
42. HAWLEY, R. D. "College Training as Preparation for Life and for Living," *School and Society*, XLVIII (1938), 468-72.
43. HARTZELL, M. D., and MURPHY, F. E. "Cleeton Interest Inventory Measures Cosmetologists," *Occupations*, XX (1942), 600-601.
44. HOPPOCK, R. "Occupational Ability Patterns: Some Popular Misconceptions," *Occupations*, XII (1934), 46-48.
45. JACOBSEN, C. F. "Interest Patterns and Achievement in Medical School," *Journal of the Association of American Medical College*, XVII (1942), 153-63.
46. JACOBSEN, M. M. *The Quantitative Determination of Scholastic Interests Among College Students*. Unpublished Doctor's dissertation, University of Minnesota, 1928.
47. KEYS, N., and NATHAN, JEANETTE M. "Occupations for the Mentally Handicapped," *Journal of Applied Psychology*, XVI (1932), 497-511.
48. KITSON, H. D. "Creating Vocational Interests," *Occupations*, XX (1942), 567-71.
49. KOGAN, L., and GEHLMANN, F. "Validation of the Simplified Method for Scoring the Strong *Vocational Interest Blank for Men*," *Journal of Educational Psychology*, XXXIII (1942), 317-20.
50. KROGER, R., and LOUITTIT, C. M. "The Influence of Father's Occupation on the Vocational Choices of High-School Boys," *Journal of Applied Psychology*, XIX (1935), 203-12.
51. LALEGER, G. E. *The Vocational Interests of High School Girls*. Teachers College Contributions to Education, No. 857. New York: Teachers College, Columbia University, 1942.
52. LEHMAN, H. C., and WITTY, P. A. "Further Study of the Social Status of Occupations," *Journal of Educational Sociology*, V (1931), 101-12.
53. LEWIS, W. D., and McGEHEE, W. "A Comparison of the Interests of Mentally Superior and Retarded Children," *School and Society*, LII (1940), 596-600.
54. LIVESAY, T. M. "Test Intelligence and Future Vocation of High-School Seniors in Hawaii," *Journal of Applied Psychology*, XXV (1941), 679-86.
55. LORGE, I. "The Prediction of Vocational Success," *Personnel Journal*, XII (1933), 189-97.
56. ———. "Retests after Ten Years," *Journal of Educational Psychology*, XXV (1934), 136-41.
57. LORGE, I., and BLAU, R. D. "Broad Occupational Grouping by Intelligence Levels," *Occupations*, XX (1942), 419-23.
58. LURIE, W. A. "Estimating the Level of Vocational Aspiration," *Journal of Social Psychology*, X (1939), 467-73.
59. NEUBERG, M. J. *Principles and Methods of Vocational Choice*. New York: Prentice-Hall, 1934.
60. NICK, E. W. "High-School Boys Choose Vocations," *Occupations*, XX (1942), 264-69.

61. PARRY, D. F. "When Vocational Guidance Tests Disagree," *School and Society*, LV (1942), 508-11.
62. PATERSON, D. G., and DARLEY, J. G. *Men, Women, and Jobs*. Minneapolis: University of Minnesota Press, 1936. Pp. 145.
63. PETERS, E. F. "Factors which Contribute to Youth's Vocational Choice," *Journal of Applied Psychology*, XXV (1941), 428-30.
64. REMMERS, H. H. "An Experiment on the Retention of Attitudes as Changed by Instructional Materials," Further Studies in Attitudes, Series III, pp. 20-22. *Studies in Higher Education*, No. 34. Lafayette, Indiana: Division of Educational Reference, Purdue University, 1938.
65. REMMERS, H. H., and WHISLER, L. D. "The Effects of a Guidance Program on Vocational Attitudes," Further Studies in Attitudes, Series III, pp. 68-82. *Studies in Higher Education*, No. 34. Lafayette, Indiana: Division of Educational Reference, Purdue University, 1938.
66. ROTHNEY, J. W. M. "Evaluative Attitudes and Academic Success," *Journal of Educational Psychology*, XXVII (1936), 292-98.
67. ———. "Interests of Public Secondary-School Boys," *Journal of Educational Psychology*, XXVIII (1937), 561-94.
68. SEGEL, D. "Differential Prediction of Scholastic Success," *School and Society*, XXXIX (1934), 91-96.
69. SEGEL, D., and BRINTLE, S. L. "The Relation of Occupational Interest Scores to Achievement," *Journal Educational Research*, XXVII (1934), 442-45.
70. SISSON, E. D. "Vocational Choices of College Students," *School and Society*, XLVI (1937), 765-68.
71. ———. "An Analysis of the Occupational Aims of College Students," *Occupations*, XVII (1938), 211-15.
72. ———. "The Predictive Value of Vocational Choices of College Students," *School and Society*, XLVII (1938), 646-48.
73. SKODAK, M., and CRISSY, O. L. "Stated Vocational Aims and Strong Interest Scores of High-School Senior Girls," *Journal of Applied Psychology*, XXVI (1942), 64-74.
74. SPARLING, E. J. *Do College Students Choose Vocations Wisely?* Teachers College Contributions to Education, No. 561. New York: Teachers College, Columbia University, 1933. Pp. 110.
75. STRONG, E. K., JR. *Change of Interests with Age*. Stanford University, California: Stanford University Press, 1931. Pp. 255.
76. ———. "Interest Maturity," *Personnel Journal*, XII (1933), 77-90.
77. ———. "Permanence of Vocational Interests," *Journal of Educational Psychology*, XXV (1934), 336-44.
78. ———. "Classification of Occupations by Interests," *Personnel Journal*, XII (1934), 301-13.
79. ———. "Interests and Sales Ability," *Personnel Journal*, XIII (1934), 204-16.
80. ———. "Predictive Value of the Vocational Interest Test," *Journal of Educational Psychology*, XXVI (1935), 331-49.

81. STRONG, E. K., JR., and CARTER, H. D. "Efficiency Plus Economy in Scoring an Interest Test," *Journal of Educational Psychology*, XXVI (1935), 579-86. Pp. 147.
82. SUPER, D. E. *Avocational Interest Patterns: A Study in the Psychology of Avocations*. Stanford University, California: Stanford University Press, 1940. Pp. 147.
83. ———. *Dynamics of Vocational Adjustment*. New York: Harper & Bros., 1942. Pp. 286.
84. TAYLOR, K. VAN F. and CARTER, H. D. "Retest Consistency of Vocational Interest Patterns of High-School Girls," *Journal of Consulting Psychology*, VI (1942), 95-101.
85. TAYLOR, K. VAN F. *The Reliability and Permanence of Vocational Interests of Adolescents*. Unpublished Doctor's dissertation, Lange Library, University of California.
86. THORNDIKE, E. L. "The Prediction of Success in Vocational Life," *Occupations*, XII (1933), 21-25.
87. THORNDIKE, E. L., and OTHERS. *Prediction of Vocational Success*. New York: Commonwealth Fund, 1934. Pp. 284.
88. THURSTONE, L. L. "A Multiple Factor Study of Vocational Interests," *Personnel Journal*, X (1931), 198-205.
89. TRAXLER, A. E., and MCCALL, W. C. "Some Data on the Kuder Preference Record," *Educational and Psychological Measurement*, I (1941), 253-68.
90. TUTTLE, H. S. "Cultivating Social Motives," *Journal of Higher Education*, VIII (1937), 321-28.
91. TYLER, L. E. "The Measured Interests of Adolescent Girls," *Journal of Educational Psychology*, XXXII (1941), 561-72.
92. VAN DUSEN, A. C. "Permanence of Vocational Interests," *Journal of Educational Psychology*, XXXI (1940), 401-24.
93. VAN TUYL, K., and EURICH, A. C. "Measuring the Interests of College Students with Different Major Subjects," *Journal of Applied Psychology*, XVIII (1934), 27-44.
94. WALTERS, A., and EURICH, A. C. "A Quantitative Study of the Major Interests of College Students," *Journal of Educational Psychology*, XXVII (1936), 561-71.
95. WILSON, J. L. *The Occupations of Graduates of the University of Kentucky Compared with Their Undergraduate Choices of Occupations and Their Parents' Occupations*. Kentucky Personnel Bulletin, Vol. VII, 1933.
96. WITTY, P. A., and LEHMAN, H. C. "A Study of Vocational Attitudes and Intelligence," *Elementary School Journal*, XXXI (1931), 735-46.
97. WREN, H. A. *Vocational Aspiration Levels of Adults*. Teachers College Contributions to Education, No. 855. New York: Teachers College, Columbia University, 1942. Pp. 150.
98. WRENN, C. G. "Vocational Satisfaction of Stanford Graduates," *Personnel Journal*, XIII (1934), 21-24.
99. YUM, K. S. "Student Preferences in Divisional Studies and Their Preferential Activities," *Journal of Psychology*, XIII (1942), 193-200.

SECTION IV
EDUCATIONAL IMPLICATIONS

CHAPTER XV
IMPLICATIONS FOR EDUCATIONAL ADMINISTRATION

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I. INTRODUCTION

The preceding chapters raise many questions about ways and means for creating a school environment that will be consistent with the principles of adolescent development. For example, having discovered the fact that the developmental tasks of adolescents define most of their activities, what can school people do to enable boys and girls to work at these tasks at the right time, with adequate materials, and with a sufficient degree of success? Or, if it is known that each of a group of boys is apt to enter adolescence at a different time, what can be done about a program of social activities in the school to make it as flexible as this condition demands? Many such questions must be answered by school executives if educational programs are to improve. This chapter suggests some of the steps secondary-school administrators can take to bring about such improvement.

In a very real sense every decision a high-school administrator makes is a consequence of what he believes will contribute to desirable adolescent development, broadly conceived.¹ When he employs teachers, or janitors, or secretaries, when he plans a new building or makes a schedule or advocates a certain curriculum, or orders equipment, when

¹The word "development" is used here to include physical growth as well as all sorts of learning, academic and otherwise. High-school pupils not only learn algebra, they also learn to run away from their problems, to lose their tempers, and to be responsible.

he works on a salary schedule, or adjusts teaching loads, or develops a new office routine, or promotes good will in the community, he is acting in terms of what he believes to be the best interests of the children. Admittedly, this describes what should be true rather than what always is. No administrator would contend, however, that any other single factor should more constantly affect his judgment about what to do than the welfare of the boys and girls in his school. In the degree that this welfare is constantly considered, and assuming an administrator of good judgment, the secondary school in question will be a superior one.

The point of view that the principles of adolescent development have implications for everything the school administrator does, necessitates some choice as to which among his many activities should be discussed in a brief chapter such as this one. For several reasons the type of administrative responsibility that has been selected for emphasis relates to the way the administrator works with his staff to develop a maximally effective high-school program. One of the reasons for this selection is that the typical omnibus textbook on the duties of school administrators treats administrator-staff relationships relatively incompletely (7). A second reason is that a majority of the educationally significant face-to-face professional relations a secondary-school administrator has are with teachers. In contrast to the consequences of his association with pupils, patrons, or other administrators, teacher conferences and teacher-administrator committee work are most fruitful so far as the total school program is concerned.

The argument of this chapter rests in a sense upon two assumptions. One of them, that the only purpose of secondary-school administration is to help create conditions that will bring about desirable adolescent development, has already been noted. It is recognized that these optimal developmental conditions are determined both by the intrinsic needs of youth and by the demands of society. A second assumption upon which much of the discussion rests is that situations which are appropriate for adolescent development are the same types of situations that are most likely to promote the improvement of teachers in service. For example, if it is important that persons who want to teach adolescents effectively should attempt to find out the goals these adolescents are seeking, it is equally important for the administrator to realize that teachers do what they do in order to achieve purposes, more or less clearly formulated, that to them are important. Or to illustrate the point again, if a maximally effective high-school curriculum must be based on recognition of the fact that children are

different, so must a program of in-service teacher training make provision for diversity among teachers.

One of the great advantages in providing for teachers approximately the same conditions for learning that are thought good for adolescents is the frequently observed fact that in the school situation teachers are disposed to deal with pupils as they in turn are dealt with. The administrator is, much of the time at least, a teacher of teachers. If he is dominating and assertive and dictatorial as he works with his staff, there is considerable likelihood that the latter will, as a group, treat their pupils in much the same way. Contrariwise, the administrator who respects personality, has faith in human intelligence, and values resourcefulness and co-operativeness in others will tend, in the course of time and by his actions, to encourage and engender similar attitudes in the teachers serving with him.

II. PRINCIPLES OF IN-SERVICE TEACHER DEVELOPMENT

It is altogether probable that the above statements need not be accepted as assumptions. Certainly a great deal of evidence could be brought forth to support them. In this chapter, however, the writer prefers to devote attention to other matters. Accordingly, the remainder of the chapter represents, first, an attempt to identify those principles of human development which, if observed by the administrator in his relations with teachers, will be most apt to result in the latter learning how best to facilitate desirable adolescent development; and second, a discussion of some of the practical implications of these principles. The principles themselves, as here formulated, are not mutually exclusive. They are strikingly similar to some of the generalizations about adolescent development which are elaborated in the preceding chapters for the simple reason that human development is continuous.

1. *Teachers behave as more or less unified organisms. Mental, physical, emotional, and social development are abstractions and are inextricably related.*

This principle, of course, is applicable to persons of all ages and all cultures. While it is true that a certain experience may contribute primarily to mental, physical, or emotional development, none of these occurs apart from the others. Even though it might greatly simplify their work if they could do so, administrators cannot overlook the fact that all aspects of a teacher's personality are relevant to her success with children. If her health is poor this is reflected in her energy and disposition. If she worries a great deal about her popularity with her peers or about the success with which her work is regarded

by them or by an administrative officer, or if she is concerned about her financial situation, this anxiety affects her work. If she has not been able to develop normal social activities, her effectiveness in the classroom will be limited.

This conception of the contribution which the teacher's total personality makes to her teaching effectiveness is based upon the assumption that she accepts responsibility for the all-around development of the young adolescent and not merely for his mastery of subject matter. If one accepts as a definition of teaching the ability and willingness to stimulate a pupil to master some academic subject field, then the relationship of a teacher's emotional and social life to her instructional competence is probably less close. The preceding chapters, however, argue persuasively for the abandonment of so limited a concept of secondary-school teaching. Adolescents need the help of teachers on many fronts (8).

2. *There are a great many variations: (a) within the teacher with respect to various aspects of her development, and, (b) among teachers with respect to all phases of development.*

Studies of teaching populations indicate that the diversity in interest, in aptitudes and skills, and in understandings is great.² There are many tasks about a school that *each* teacher must be able to accomplish successfully. These define the responsibilities all teachers have in common. But, too, in any secondary school there is such variety among the things to be done that an administrator is provided ample opportunity to use the unique talents of each member of his staff. For example, some teachers have unusual ability as research persons. They understand experimental design, can make sense out of statistics, and enjoy formulating school problems so that data can be obtained to answer them. Other teachers are completely lost when they try their hand at the scientific study of educational problems. Their studies are superficial and their frustration in the presence of statistical symbolism is obvious.

When this is the case an enlightened administrator will do what he can to enable the teacher who can do research to put her talents to use. If such arrangements are made, many benefits accrue. First, it is possible to remove debate about school problems from the realm of anecdote and claim and counterclaim, if actual data can be brought

² Investigations of the factors affecting instructional success rarely emphasize the bearing of the findings upon the problem of heterogeneity among teaching populations. It is enlightening to re-examine the data from these studies with this question in mind.

into the discussion. Secondly, the teacher with the research talent and interest has a chance to be useful in a unique fashion, with consequent deserved and beneficial recognition.

A second illustration of this same principle involves the teacher who, for reasons that are complex and intangible, can converse sympathetically and effectively with adolescents about their intimate, personal problems. All teachers should be counselors but in the present stage of our ability to apply what we know about adolescents, it is unrealistic to believe that all teachers have the knack of analyzing in any deep sense the problems faced by individual boys and girls. Those few who can do so should be given much work to do. Again the benefits are two-fold. First, the high school becomes a more effective developmental environment for boys and girls. Second, the teacher with a unique talent exercises it and gets satisfaction and recognition therefrom.

3. *Teachers learn or change their behavior through experience because they want certain things that have value status for them. In other words, their learning is a goal-seeking activity.*

Despite the ease with which this statement can be accepted on a verbal level, its implications are far reaching and difficult to comprehend. It means that teachers are active *only* because of their interest in seeking certain goals or values. They get to class on time, make good assignments, counsel with pupils, are pleasant to their peers, smile at the principal, and scold parents because there are certain things they want, and all of these ways of behaving are means to an end. These ends are many times obscure and inadequately understood by the teachers themselves. It is often true that the means and the end are quite artificially related, as when a teacher cultivates the favor of the president of the board instead of teaching more effectively when she wants a salary increase. Frequently it is true, too, that the relationship between her activities and the values that she is seeking is obscure, not only to an outsider but also to the teacher herself. For example, a particular teacher's practice of speaking bitterly and contemptuously of her teaching colleagues might well be a consequence of factors which neither she nor her colleagues well understand. Mere failure to get recognition for work done well is sufficient to cause many teachers to depreciate the good work of others or persecute pupils without ever realizing that their own inability to get commendation is the cause.

When teachers, or all other people for that matter, are able to attain their chief values or goals without delay or interference, they

are not disposed to learn. It is chiefly when they come up against some obstacle or difficulty or some problematical situation that makes it impossible for them to get what they want that they change their behavior or learn. The teacher who teaches for her salary alone will learn to do what she must in order to earn that salary. The money is the big goal. Receiving it on the first of each month is all-important. Another teacher who wants most the recognition of her colleagues will do or learn to do whatever, according to her lights, will result in this recognition. The teacher who wants to see her students learn how to use scientific principles in their thinking will try this and that device until she attains this goal or sees progress toward it or changes her ambition. Teachers stop behaving in ways that in their judgment result in dissatisfactions and continue to behave in ways that lead to the attainment of desired goals. The teacher who gets satisfactions from berating children is apt to go right on berating and belittling them until the satisfactions cease. On the other hand, the teacher who can be made to realize that such treatment of children actually interferes with some of her more fundamental and broader satisfactions, will, if given help that protects her from too much insecurity during the transition period, learn behaviors which are more consistent with her fundamental values.

This, of course, means that it is as important for the administrator who is interested in teaching teachers to try to ascertain the goals they are seeking as it is for the teachers to try to understand the motivation of their pupils. It is probably just as unlikely that maximum pupil learning will occur when a teacher is ignorant of the goals her pupils are seeking as it is unlikely that maximum in-service staff improvement will occur when an administrator is ignorant of the motivation of his teachers.

4. *The ability and willingness to attack and solve problems independently or co-operatively results from much experience in both self-directed and co-operative activities leading to success.*

There probably are few more significant trends in secondary education than the tendency for the local high-school faculty to work co-operatively toward the solution of its own problems (1). In theory there are these three different ways in which the work of the school can be accomplished: the method of administrative fiat, the laissez faire method, and the co-operative method. The administrative-fiat method has intrinsic appeal to most executives and, interestingly enough, it is also favored by many teachers who claim sincere devotion to democratic principles. The number of teachers who prefer to be

told what to do rather than to work co-operatively on the solution of a problem is much larger than is commonly believed. This yearning to be told is particularly strong in those areas where precedents have not been established or where issues and values and teaching procedures tend to be obscure. Psychologically such an attitude is not difficult to understand. It is part of everyone's desire for security under circumstances which are new and frustrating. If a school venture fails it is somewhat helpful to be able to say, "The principal suggested that I do this," which carries the implication, "I, myself, was certain it wouldn't work."

The method of *laissez faire* involves a minimum of leadership, administrative direction, and co-operative group work. Each teacher or department strikes out on its own. The school program becomes spotty. Certain departments and individuals are outstandingly strong while others are weak. No one seems to know much about all-school objectives. While it is true that some teachers work effectively in this atmosphere, emphasis upon the all-around development of the adolescent precludes such compartmentalization of secondary-school activities.

The co-operative method of getting the work of the school done—and this requires a great deal of democratic staff activity—makes a strong theoretical appeal to most teachers. They have been conditioned to value highly such words as "democracy," "co-operation," and "group thinking," but to any careful and disinterested observer it frequently appears that there is little relationship between their professed and their behavioral democracy. A large majority of school administrators, too, have never made co-operative practices an obvious part of their professional activities.

One reason that many secondary-school administrators have less confidence than they might otherwise have in staff contributions to the solution of school problems is their conviction that the school board holds them solely responsible for a good school program and that this responsibility necessitates complete authority. They contend that it may be desirable to counsel with teachers, but that in the last analysis significant decisions must be a consequence of administrative judgment. Any other procedure, they believe, will lead to confusion (11).

III. PRACTICAL IMPLICATIONS

The four principles or generalizations about teachers which were stated above have many practical implications. The remainder of this chapter is a discussion of certain ones of these implications which seem important to the writer.

a) *Recreation Facilities.* There are many arguments in favor of having teachers in a school system know one another personally as well as professionally. One is the fact that teachers who do know one another personally can take part in professional discussions that are fruitful of consequences and relatively free from abuse, personal re-primination, and bitterness. The reaction of the teacher to a colleague she knows likes her but who is disputing with her professionally, is something like this: "Now I recognize that you're talking against a professional idea that I value highly but I also know that you like me as an individual. Consequently, it doesn't hurt me quite so much for you to attack this professional idea because I know it isn't the only thing you know about me. There is much that you like and respect."

Quite a different situation results when professional discussions are carried on among persons who know one another only professionally. Under such circumstances the feeling of the disputants is that each is attacking the only thing he knows about the other. This being realized by both parties, the discussion frequently leads to resentment and defensive reactions and, incidentally but very important, to slight change of opinion.

This limitation in professional staff discussions carried on by persons who are not friends becomes serious when stress is placed upon co-operative staff study of local instructional and curricular problems. In schools where each teacher operates in a restricted area and is responsible only to an administrative superior, the sort of horizontal intra-staff communication that is made more fruitful by pleasant personal relations is reduced to a minimum.

In many schools specific arrangements have been made to facilitate personal acquaintance among teachers. Annual dinners or formal staff meetings rarely serve the purpose. It is important, at first at least, to have gatherings wherein the normal, professional inhibitions operate slightly, if at all, and in which numerous opportunities are given for a wide variety of activities where competition is reduced and exceptional achievement possible for everyone.

It would be misleading to imply that teachers who for many years have known one another only professionally, will, as a consequence of one or two evenings in a hobby shop, be calling one another by first names. Many teachers prefer the privacy and protection of formality. In a competitive school atmosphere they have learned that they are somewhat safer if inaccessible. Some teachers and administrators, too, prefer a school in which unreserved discussions of fundamental educational policies and procedures are kept at a minimum. Such discus-

sions are disturbing to persons who find security in stability. Informality and ease of communication at one level and in one context, however, facilitate informality and ease of communication at another level and in another context. If it is deemed desirable to have teachers work together professionally with a minimum of personal conflict and friction, arrangements made to develop better personal acquaintance are steps in the right direction.

b) *Induction of New Teachers.* It is generally recognized by secondary-school guidance-workers that a pupil's general adjustment toward his school is influenced greatly by the initial impression he receives of his peers and the over-all school situation. Consequently efforts are made to provide orientational experiences that will help new pupils both to get acquainted with one another and with upper classmen and to learn something of the traditions and facilities of the school. Such "induction" proceedings contribute to a pupil's security and sense of well-being by making him feel that he is a member of the group and somewhat familiar with its activities.

It is probably equally true that a teacher's enduring attitude toward her work is greatly affected by the initial impression she receives of her colleagues and working conditions. In most secondary schools, apart from a more or less inept introduction at the first faculty meeting and less possibly a dinner for new teachers at the principal's home or the local hotel, little attention is paid to inducting new staff members. Frequently the other members of a faculty do not know who their new colleague is until they meet her in the corridor. This makes for distrust and an unwillingness for the entire group to accept responsibility for the success of the newcomer. This attitude is sensed by the new teacher; she seeks the company of the like-minded and a schism develops between the new and the old.

A very slight amount of administrative or staff ingenuity can improve this situation materially. In the first place each new teacher employed can be interviewed not only by members of the administration and by board members but also by at least those of her future colleagues who will work intimately with her. The fact that so many appointments are made during the summer vacation makes teacher interviews with prospective candidates difficult; but rarely is it actually impossible to provide for them. A staff committee on teacher induction can readily see that the new arrival meets the other teachers, gets acquainted with the community, and learns about the schools' unwritten laws and procedures. Incidentally, steps taken by an administrator or his staff to orient new teachers more satisfactorily are always apt to

establish a tradition of being considerate and helpful to all newcomers about the school, be they pupils, parents, or members of the non-instructional staff.

c) *Protecting Teachers' Feelings.* Administrators can do much to make the school environment a better one for adolescents by recognizing that the effectiveness of a teacher's work depends in large measure upon how she feels about it.³ Whether or not she is happy and pleased and in good spirits on the one hand, or dejected and hurt and ill-humored on the other, is exceedingly important. Not infrequently administrators miss the implications of this fact and come to pride themselves on their courage if they can "take a teacher to task" or "rake her over the coals," or "tell her off," or "put her on the carpet," for admittedly committed and more or less serious misdemeanors. Some administrators feel that their success is in large measure determined by this so-called courageous administration.

The serious implications for staff morale of such tactics are frequently not appreciated. While the consequences have not been adequately studied in the school context, enough is known about personality development to indicate that the teacher who has been taken to task by an administrator in such a way as to have her feelings seriously hurt does not normally accept the administrator's judgment that she has been remiss in her behavior. What she does instead is, first, to resolve not to be caught again and, second, even if at one time she might have admitted that she was wrong, she eventually rationalizes to blame the principal or something else outside herself because she must do so to save her "face." High-school principals, of course, do the same thing under similar circumstances.

Some administrators recognize the effect upon a teacher's morale of a thorough "bawling out" and consequently consistently refuse to resort to this technique as an instrument for in-service improvement. Such administrators are more concerned with having a teacher discover for herself that what she does is not in her own best interests or in the best interests of the children. They are less interested, too, in being recognized as having the courage to come out in the open and "call a spade a spade." It takes longer to have a series of conferences with a teacher and to try to help her to think her professional problems through until she sees their implications, but in terms of permanent staff improvement the time is well invested.

³ The general question of the maintenance of staff morale concerns all administrators. For a more complete discussion of this matter as affected by a war economy see Corey (5).

Again, administrative procedures that result in making teachers happy in their work not only contribute to desirable staff morale, but also create an atmosphere that will almost inevitably affect favorably the learning of the boys and girls. Not only will there be less disposition to "take it out on the pupils," but in a more positive sense the greater satisfaction the teachers get from their work will make that work even more successful.

d) *Psychological Counseling.* School principals and superintendents are, for the most part, in a poor position to act as successful psychological counselors for members of their own teaching staff. The very fact that they have it in their power to "hire and fire" precludes much possibility for "deep" counseling. Nevertheless, even though his position probably makes it impossible for him to function in this capacity, the successful administrator will try to see to it that there is someone available on the staff, either a guidance officer or a psychologist, or even a mature, wise teacher, who can talk with the members of the faculty about their adjustment problems.

In this connection school administrators and supervisors might well take a cue from industry (12). Some have, of course, but the majority, so far as their supervisory relations with teachers are concerned, resemble the earlier efficiency experts in industry. They are prone to forget the subtle and significant personal problems that have much to do with efficiency either in the factory or in the schoolroom. The chief purpose of psychological counseling as recommended here is to enable teachers to express their feelings and emotions, and with the aid of sympathetic and discerning help, to identify alternative solutions to their problems and eventually to select one and try it out.⁴ Such interviews are not to admonish or to persuade or to tell what should be done. The assumption must be that most teachers who face problems resulting in tension are sufficiently intelligent to remap their own lives if they are given an opportunity to bring their thoughts out into the open where they themselves can examine them.

The emotional maladjustments from which teachers suffer are usually the consequence of many months or years of indecision and anxiety. They are not, of course, to be eliminated by the procedure of having a one-hour interview with an intelligent counselor. Radical self-education is involved. Most maladjustments result because teachers actually get satisfaction from their maladjusted ways of behavior. The source of these satisfactions is not recognized in many cases, how-

⁴For an excellent general discussion of this sort of interviewing see Rogers (13).

ever. To help the teacher reveal them to herself is one of the purposes of the counseling interview. These insights are achieved gradually but they are essential if any beneficial change is to take place.

e) *Obligation To Study Teachers.* Any recognition of the great differences among teachers with respect to all factors associated with their work implies that a major administrative responsibility is to study the talents and limitations of a staff. Most successful administrators accept this responsibility and recognize, too, that they must develop not only ways and methods for acquiring information about teachers but also ways and means for making it possible for teachers to learn more about themselves.

Anyone who has tried to do so recognizes how difficult it is to acquire a penetrating understanding of another person. In ordinary social intercourse we are impressed or unimpressed by superficial mannerisms and personality traits which either please or displease us, and we rarely go beyond this facade in our attempts to find out what a person is like. Few school administrators, for example, could answer questions such as these about each or even a majority of their teachers:

1. With what degree of success can she communicate with pupils about their individual problems?
2. How much insight does she have into the nature and origin of the pupil's problem?
3. How successfully is she able to suggest learning experiences to pupils which they recognize will give them genuine help?
4. With what skill can she construct evaluation instruments that measure the actual behavior of her pupils?
5. How capable is she at getting along even superficially with her teaching peers?
6. Is she sought out frequently by other teachers as a counselor?
7. Are the learning experiences she suggests for pupils highly varied?
8. Is she a capable and effective public speaker?
9. Do her home responsibilities constitute a drag on her energy and spirits?
10. Is she worried financially because of obligations that cannot be met adequately by her salary?
11. Does she have skill in directing the work of a group of teachers?
12. Is she effective in working with parents in order to bring them to a better understanding of the school?

Modern educators make a great deal over the importance of case studies of children that will provide a functional record of their past experience including a wide variety of developmental facts and interpretations. Equally strong arguments can be advanced for the importance of an administrator accumulating information about his

teachers which will serve somewhat the same purpose as the case record of a pupil. While it is true that in many schools there are available for each teacher some data on such matters as age, summer school experience, previous teaching appointments, colleges attended, and degrees earned, it is rare that an administrator can place his hands, much less his memory, upon a description of the general personality and professional competence of each member of his staff. Quite often administrators claim that they carry this information about in their heads, but again its paucity is made clear when protracted conversations are held about particular teachers.

f) *Using Special Competencies.* An opportunity to use the special competencies, professional and otherwise, of individual teachers increases when an administrator encourages co-operative staff study of local problems. Some critics insist that American education has gone too far in its attempt to get highly specialized experts to do the work of the school (16). Consequently there has been a tendency to overlook the advantages of keeping all teachers aware of what is going on and using their special abilities, as the occasion arises, for unusual types of leadership.

Especially is this true of faculties numbering more than twenty-five persons. In such a group an alert administrator who studies people will be able to identify teachers who can assume leadership in many specialized aspects of the secondary-school enterprise. There will be some persons unusually interested in guidance or child development, others in curriculum construction or evaluation, and others in the use of community resources. The sheer technical competence of these people may not approximate that of the experts from the nearest university, but this limitation is not an unmixed evil. The degree of mastery of the specialized field which they possess will at least be much closer to that of the group that is to be influenced. Summer schools, workshops, and extension courses can be used to develop more technical skill as it is required.

An illustration of the values of this approach is the school faculty that became interested in the problems of child development, yet refused to employ an expert in the field. One reason for the refusal was the realization that knowledge of child development principles should affect the practices of all teachers, and that it is less likely to do so if an expert comes into the system who can be used by some teachers to escape their own responsibilities. Consequently, the decision was reached to study child development as a faculty and to have as leaders those classroom teachers who had already shown not only unique apti-

tude for counseling with children but also a willingness to read modern materials on the subject. As the result of group discussion the judgment of teachers and administrators was pooled, with the consequence that four such teachers from a faculty of fifty-five were identified. Not only were they familiar with and competent in classroom procedures but they also had developed an unusual interest in the general field of child development. These persons were relieved of a fraction of their other responsibilities and were designated by the group as the ones who should accept major responsibility for planning and directing child study and for making available the necessary materials.

Not only is it possible to get the work of the school done better by being acquainted with the special abilities of the teachers, but the general *esprit de corps* within a faculty increases as a larger number of individuals are given an opportunity to do some of the things that they know they do well and from which recognition results. Morale is better, in other words, if there are many different types of achievement at which various individuals can excel than if the avenues for superior achievement are restricted in number and a great deal of competition develops to see who will come out on top. Continuous rewarding of teachers for doing well what they are uniquely capable of doing is a sound investment in school betterment. And such rewarding of teachers is not a type of self-sacrificing activity that is beyond the virtue limits of secondary-school administrators. From whatever point of view is assumed, it is practical and wise. Not only will such recognition of competence result in a better school program for the reasons indicated above, but in even the short run it will result in recognition for an administrator that is well founded and permanent. Respect and admiration are usually reciprocated so that from even a narrowly selfish point of view more aggrandisement for the administrator results when fifty people blow his horn than when he alone blows it.

It should be emphasized that becoming thoroughly acquainted with teachers is of value not only so that their special abilities can be used but also because only on the basis of such knowledge can broadening experiences be suggested to those teachers who have overspecialized. It requires more than casual acquaintance for an administrator to learn that a teacher of mathematics needs to improve his examinations if his pupils are to use mathematical principles in their thinking, or that a teacher of social studies gives his pupils no experiences in arriving at democratic decisions, or that a teacher of music spends all of his time helping the children who need it least. Such teachers need specific

experiences that will not only convince them of the error of their ways but will also develop in them the ability to do better.

g) *The Case Conference.* Some administrators find that holding staff case conferences is an effective in-service training technique. Such conferences are difficult to conduct with teachers who are concerned only with the academic development of their pupils. Problems of general personality adjustment to them are more or less irrelevant. Even for teachers with broader vision, the successful staff case conferences, while recognized at the start to be theoretically desirable, requires much practice. The constant hazard is that the discussion will degenerate to the level of gossip. The home situations of some disturbed adolescents are *per se* of such fascination to teachers that the real purpose of reporting such data is lost sight of. In some cases parents, too, resent penetrating inquiry into the developmental history of their offspring.

Despite these difficulties, the administrator who encourages teachers to learn about their pupils through highly individualized case conferences achieves a number of desirable purposes. First, and possibly most important, the teachers learn much that is significant about their pupils. Second, when teachers participate in thoughtful and penetrating discussions of adolescents, they achieve added insight into their own problems. Third, and of great importance to the administrator trying to learn more about his teachers, their comments on the development of children reveal unmistakably their insight into the process. This seventy-word statement of a teacher suggesting that one of his pupils be "cased" illustrates the projective value of teachers' comments about children:

We should go into John very thoroughly at our next meeting. He has been most troublesome lately. As I am trying to develop some point he persistently asks questions which interrupt the entire procedure. Just as I am building up to a climax, he waves his hand and interjects a question that none of the other pupils would ever ask. The fact that he seems really puzzled is no excuse.

h) *Defining the Teacher's Responsibilities.* In the case of many teachers, satisfactions from their professional labors are fewer than they might otherwise be because there is a lack of clarity as to what is expected for professional success. Neither have the teachers been told what goals would direct and give meaning to their teaching, nor have they participated in the determination of these goals. Many advantages obtain if such goals can be defined by the teachers *and* administrators rather than being revealed by administrative fiat. It is

undoubtedly true that in most school systems when ambiguity regarding the values to be sought by good teachers is expressed, an administrative officer tells teachers what they should do. Such telling of teachers what they should do is relatively easy and often leads to verbal acceptance and apparent progress. The method always leaves unanswered, however, the question as to whether or not the teacher herself appreciates the basic value of the procedures and aims which the administrative officer has suggested. In the absence of such realization the teacher will probably be unable to behave consistently with them when under her own steam. It is because of this limitation that there is such great advantage in having teachers and administrators, as *peers*, arrive at an understanding of the responsibilities involved in teaching. The experiences of one school that attempted this are here recounted, the co-operative activities being described more or less chronologically (4).

At an early staff meeting at which the general question of morale was discussed, many of the teachers made clear their belief that one important factor affecting morale is the degree to which teachers understand clearly what is expected of them so far as their professional activity is concerned. During the course of the discussion of this problem many of the teachers expressed vague notions as to what they thought was expected of them but their definitions of their own responsibilities were so lacking in clarity as to imply a great deal of confusion. They actually did not know to their own satisfaction the goals that good teachers should seek. Consequently it was suggested that all members of the staff write out a list of the three or four most important obligations that persons teaching in the school in question should accept.

Inasmuch as the school involved was a laboratory school associated with a university, the responsibilities to be met by successful teachers were different from those that might be defended in a public school. When duplications and slight terminological differences were eliminated the following list emerged as a description of these specific, if somewhat overlapping, responsibilities that the teachers themselves felt everyone should accept:

1. Becoming increasingly familiar with and applying in practice those facts and principles of child development that aid in guiding the growth of high-school pupils.

2. Combining a functional understanding of children and scholarship in one's chosen field in such a fashion as to be able to bring about rapid, permanent, and worth-while pupil learning.

3. Working actively and co-operatively with other members of the high-school staff in the solution of problems involved in the education of adolescents.

4. Living a balanced life.
5. Maintaining a degree of scholarship in a field of specialization that makes possible the assumption of leadership among other teachers in that area.
6. Understanding and applying to their teaching important principles derived from the study of social trends in America.
7. Rendering consultative and other professional services to agencies, groups, and individuals concerned with educational problems.
8. Producing needed curriculum materials of tested effectiveness.
9. Conducting and publishing the results of research pertaining to the curriculum, methodology, child development, and other important educational problems.

As the staff proceeded to define further its duties, the fact became increasingly clear that any general statement left much to be desired in the way of specificity. Without specificity it was almost impossible for the various teachers to get any idea of their own success in reaching the standards. Consequently, through committee action, the various responsibilities were further analyzed and defined in terms of what teachers actually must do to meet them. For example, the following statements describe some of the things a teacher must actually *do* if her behavior is to be consistent with "becoming increasingly familiar with and applying in practice those facts and principles of child development that aid in guiding the growth of high-school pupils."

- a. Know something about the history and present status of children in her class.
- b. Observe accurately the needs, interests, and values of children and give rich and pertinent accounts of them.
- c. Periodically make studies of the interests and reactions of her class.
- d. Systematically and regularly consult school records, test scores, and similar evidence.
- e. Frequently record and share with other teachers pertinent information describing children.
- f. Consult with other teachers about children, pursuing any promising course.
- g. Confer with parents frequently, seeking new facts and attempting to interpret the child to them.

Many administrators would express reluctance to trust teachers to define their own duties and set their own goals because of a suspicion that doing so would lead them to set standards which are relatively low and easy to attain. This suspicion is rarely borne out by observations of actual practice. The fear is probably as unfounded as the belief held by some that children on a high-school student council

will be too lenient in their disciplining of other children who have committed misdemeanors. Just the opposite is true.

One generalization growing out of the project described above was that the most important function of any work done to clarify the professional goals of teachers is to provide them with a means of self-evaluation and improvement. It is exceedingly difficult to elicit staff participation in a study of this sort if many members of the group feel that the purpose is to establish some standards that will be used by administrative officers as a basis for the employment or dismissal of teachers. The accepted belief has been that this is a responsibility of the administrative officer that the teachers are under no obligation to share. This conviction is as deeply rooted in the thinking of most teachers as is the analogous belief of pupils that in the classroom they should have nothing to do with appraising or evaluating one another's learning. That is the teacher's job.

A second generalization called attention to the fact that goals defined by a group in description of its own activities are much more apt to influence the behavior of the group than are goals set up and announced by an administrator. This does not mean that teachers do not like to be told what to do; as previously observed, many of them do. An administrative officer who exercises the power of discharge over a group of teachers can, by making very specific suggestions, bring about conformity with his views to a certain degree. However, in the absence of a broad understanding on the part of the teachers of the significance of the practices he recommends, the result is apt to be lip-conformance only.

i) *Rewarding Good Works.* What is known about the psychology of learning indicates that learning is more apt to occur as a result of rewarding what is desirable than of punishing what is bad. The implication of this principle so far as relationships between an administrator and his staff are concerned are far reaching and have been touched upon above. It is one thing to try to influence teachers by threatening them with punishment of one sort or another for their derelictions and quite another to make it a point continuously to commend them for what they do well. The latter practice builds up self-respect and confidence and provides an intelligent administrator with many opportunities to show the relationship between what he thinks the teacher does well and other activities that are less consistent with good principles of instruction.

A brief case which is not hypothetical and which illustrates "rewarding of good work" is given as an example:

Teacher "A," as a result of a workshop experience, developed interest in and aptitude for constructing evaluation instruments or tests which measured the ability to apply principles. This teacher was no more than mediocre in most aspects of her work, but she had a great deal of talent for test construction and spent much of her time in that activity. Her supervisor felt that too much of her energy was drained off in this direction and that she got too large a fraction of her total professional satisfactions from doing good work in the areas of formal testing. Instead, however, of admonishing this teacher for her unwillingness and lack of skill at communicating with the pupils or helping other teachers with their evaluation problems, this supervisor singled out for special and sincere commendation the tests that the teacher had developed. Because of her interest in these tests it was possible to have the teacher realize the implications of good tests for classroom objectives. Consequently, some of her interest was directed to describing in specific behavioral terms the ends or aims of instruction at the ninth-grade level. Considerations of these ends or objectives of instruction led eventually to a realization of the importance of personality development. Because of the teacher's interest in testing and measurement, she eventually saw how important it was to appraise or evaluate the personality development of her children. This, of course, involved techniques that would depart from the conventional paper-and-pencil-test methods and led the teacher to an interest in projective testing, interviewing procedures, and pupil counseling. All of this, of course, did not take place within a short period; but it is to be noted that the techniques employed by the supervisor were consistently positive, commendatory and status-maintaining, rather than admonitory, critical, and destructive.

Because schools exist for children, it must be granted at the outset that not all teachers are worth saving as teachers. When they are, however, the positive constructive method of dealing with them works just as effectively as the same method does with high-school boys and girls. The great secret of such a method is to have sufficient patience and counseling ability to bring a teacher to a point where *she* realizes the implications of some of the things she does well for her other practices that are not carried on at so high a level. Permanent change comes about when the teacher realizes her own limitations and recognizes what she can do to improve. To have an administrator call deficiencies to her attention in no uncertain terms has little educative value. The latter, as was suggested above, even when done tactfully, leads to more or less ill-defined antagonisms and defenses and rationalizations. The purpose of in-service staff improvement is to have teachers seek better instructional goals that are their own rather than to have them to try to seek goals that they do not adequately understand, but which are valued because a superior announces them.

j) *Co-operative Study of Local Problems.* One of the outstanding

generalizations resulting from the Eight-Year Study of the Commission on the Relationship of School and College of the Progressive Education Association was that the high schools that were most effective in changing the behavior of their pupils were high schools that studied their own local instructional and curricular problems co-operatively (1). These were schools in which most members of the faculty were working toward all-school objectives and in which all teachers knew much about the total school enterprise.

The problems a school faculty can attack co-operatively are, of course, legion. Within the past two years the administrators and teachers in the University of Chicago High School have concerned themselves as a faculty with:

- a. Improving the willingness and ability of pupils throughout the school to accept responsibility (2).
- b. Developing a staff philosophy with a study of its implications for practice (3).
- c. Studying pupil out-of-school activities.
- d. Studying objectively the work load of the teachers.
- e. Developing a statement of the nature of successful teaching in the Laboratory Schools (4).

In those schools where a great deal of this co-operative staff study of local problems is carried on, a number of things have been learned that tend to make such activity more fruitful. One of these principles is that a staff should begin its co-operative work on a problem that the staff agrees to be significant despite the suspicion on the part of the administrator that another problem may be the real one. No matter where the group "bites in," continued investigation always turns up problems of fundamental importance. For example, the very practical problem of trying to do something to make pupils behave better in the corridors leads eventually to questions of curriculum improvement and even to questions of staff morale.

A second principle that has grown out of these co-operative staff studies of local problems is that progress is most rapid when all members of the group are at work. A problem once defined may be conveniently broken down into subproblems, each of which can engage the attention of a staff committee. The entire group then meets as a group only often enough to keep itself appraised of over-all progress. The subcommittees dealing with various phases of the major problem function best if they are formed voluntarily. Each individual is then pursuing an activity that is of some significance to him personally.

A third generalization is that, in group thinking about any prob-

lem, it is imperative that operations start at the level at which the group finds itself and that great pains be taken to bring the entire group along from step to step in the procedure. The temptation to call in an expert or to refer to what has been done elsewhere and then accept the recommendation of the expert or try to adopt what has been done elsewhere is a strong one. Yielding to it, however, results in what appears to be growth but often is not. It is more apt to be a sort of verbal acceptance which leads to very few actual behavior changes. The fundamental problem, of course, is one of when and how to use expert advice as well as when and how to take advantage of what has happened at other places where groups have faced similar situations. The writer believes that more mistakes result when a premature reference is made to the expert or to the experience of other faculties in other schools than are made as a result of postponing consultation with the experts until the local group has had its feet solidly on the ground and has developed some frame of reference of its own.

The function of the administrator in these staff studies of local problems is two-fold. First, as a member of the group he contributes ideas, labor, and arguments in line with his convictions. This role is a most difficult one because peer status is hard to maintain. Staff members ordinarily weigh too heavily the suggestions of the administrator because of the authority vested in him *ex-officio*. Teachers require much convincing before they can accept the principal or superintendent as an equal and one from whom retribution need not be feared.

The second aspect of the administrator's function involves doing all he can to expedite the process of staff deliberation. Schedules must be rearranged, clerical and stenographic help provided, books and consultants procured, trips arranged, meeting places for committees provided, summer-school tuitions for special study obtained from the school board, arguments arbitrated, reports edited, and eventually, the changes recommended must be put into effect. Doing all of these things requires tact and ingenuity and time.

IV. CONCLUSIONS

This chapter has dealt almost exclusively with staff-administrator relationships. The assumption was made early in the discussion that the sort of learning atmosphere which previous chapters have implied is good for adolescents is also desirable for the in-service training of high-school staff members. It was contended furthermore that teachers are disposed to create learning situations for children that are somewhat like those that are created for themselves in a program of in-

service improvement. Most of the recommendations discussed imply a concept of educational leadership that is much more widely accepted in theory than in practice.⁵ The question of leadership within a democratic organization has always plagued administrators. Leadership soon becomes dictatorship, or at least benevolent paternalism, unless the administrative leader is constantly aware of the dangers in his position. The principal or superintendent who insists upon functioning as a leader rather than a "director" recognizes the importance of laying hands on as many ideas and suggestions as possible. He is but slightly concerned with earning a reputation as the fellow who has all the inspirations and is aggressive in putting them into effect. Because this latter role is the one most people think a successful school administrator must play, the democratic leader will find the going rough. He will find himself tempted again and again to tell people what to do.

The chief difficulty, of course, when people are told what to do in a job that by its very nature requires much individual initiative and resourcefulness, is that the directions cannot ever be sufficiently explicit. A secondary difficulty is that the followers of directions are chronically unable to accept personal responsibility for the success of the enterprise.

REFERENCES

1. AIKIN, WILFORD M. *The Story of the Eight-Year Study*, chap. ii. New York: Harper & Bros., 1942.
2. COREY, STEPHEN M., and FROEHLICH, GUSTAV J. "A High-School Staff Studies Pupil Responsibility," *School Review*, L (1942), 568-76.
3. COREY, STEPHEN M., and JACOBSON, P. B. "A High-School Staff Studies Its Philosophy," *School Review*, LI (1943), 269-78.
4. COREY, STEPHEN M. "A High-School Staff Appraises Itself," *School Review*, LI (1943), 594-600.
5. ———. "Maintaining Staff Morale in Wartime," *War and Postwar Responsibilities of American Schools*, Part IV. (W. C. Reavis, editor). Chicago: University of Chicago Press, 1943.
6. COURTIS, STUART A., and OTHERS. *Co-operation: Principles and Practices*. Eleventh Yearbook of the Department of Supervisors and Directors of Instruction. Washington: National Education Association, 1938. Pp. 244.
7. JACOBSON, P. B., and REAVIS, W. C. *Duties of School Principals*, chap. xvi. New York: Prentice-Hall, Inc., 1941.
8. JOHNSON, B. LAMAR (editor). *General Education in the American High School*. Chicago: Scott, Foresman & Co., 1942. Pp. 319.

⁵For a more complete discussion of this point of view see references 6, 9, 10, 11, 14, 15, and 16.

9. KOOPMAN, ROBERT G. and OTHERS. *Democracy in School Administration*. New York: D. Appleton-Century Co., 1943. Pp. 330.
10. LIND, NELLIE, and OTHERS. *In-Service Growth of School Personnel*, pp. 229-576. Twenty-first Yearbook of the Department of Elementary School Principals. Washington: National Education Association, 1942.
11. MORGAN, DEWITT S. "Difficulties Inherent in the Development of Democratic Procedures in School Administration," *Democracy in Educational Administration*, chap. iii. (W. C. Reavis, editor). Chicago: University of Chicago Press, 1939.
12. ROETHLISBERGER, F. J., and DICKSON, W. M. *Management and the Worker*. Cambridge, Massachusetts: Harvard University Press, 1941. Pp. 615.
13. ROGERS, CARL R. *Counseling and Psychotherapy*. New York: Houghton Mifflin Co., 1942. Pp. 450.
14. RORER, JOHN A. *Principles of Democratic Supervision*. New York: Columbia University Press, 1942. Pp. 230.
15. SPEARS, HAROLD, and OTHERS. *Leadership at Work*. Fifteenth Yearbook of the Department of Supervisors and Directors of Instruction. Washington: National Education Association, 1943. Pp. 248.
16. WOODY, CLIFFORD (editor). *The Discipline of Practical Judgment in a Democratic Society*. Eighteenth Yearbook of the National Society of College Teachers of Education. Chicago: University of Chicago Press, 1943. Pp. 268.

CHAPTER XVI

IMPLICATIONS FOR TEACHERS AND COUNSELORS

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I. INTRODUCTION

The first three sections of the yearbook summarize our knowledge of adolescent growth and development, and note the problems encountered by American youth in the process of reaching maturity. Many questions are raised, and suggestions are occasionally made as to the ways in which a school can best aid the adolescent in successfully meeting the tasks which he encounters in growing up. This chapter sketches in broad outline the function of the school in relation to the growth, development, and learning of the adolescent.

1. The Functions of the School

In defining the role of the school it may be well to state briefly a few basic assumptions as to its function. Our schools have a two-fold task: (1) to maintain our culture, along with the conditions for creative change, and (2) to provide boys and girls with surroundings favorable to learning and development, and to work with them to the end that they may be fitted for later life.

Inasmuch as the tradition and purpose of this nation emphasize democracy, major attention in the schools must be given to democratic values, aspirations, and behavior. The ultimate aim of education is to broaden and deepen the understanding and practice of the democratic way of life. This would be no easily reached objective even in a static society, and is doubly difficult in a culture as rapidly changing as ours. Faced with a technological revolution which has been called one of the three great mutations in the whole of man's history, readjustments are necessary in many aspects of life. Some parts of our culture are

changing rapidly, others are not. With great areas open to change, a system of education based entirely on habit formation and conditioning is inadequate. The fluidity of our vocational, economic, and social life presents the individual boy and girl with many situations in which new choices must be made, and in which new patterns and new ways are to be formulated.

In addition to training boys and girls to think and to make adaptations, schools must help them in developing a system of values. Only when intelligence operates in terms of well-formed values can problems be solved in the interests of the present and future welfare of the total social group. It is axiomatic that the members of a democracy must achieve an understanding of social needs and of the conditions likely to result in the welfare of the greatest number.

Thus, in maintaining our culture the school has the task of realistically transmitting those patterns which are relatively fixed and static. In addition, it must promote the ability to face intelligently those areas subject to change and modification in which the individual must choose and decide. Further, in helping shape the future of our culture, the school should develop new patterns, where this is possible within our present framework, and emphasize democratic values and ways of thinking out solutions in those areas in which present patterns are not adequate. The evidence seems perfectly clear that a culture can be improved and that schools can assist in this process. The exact methods, or the extent of this assistance, is not a particular concern of this chapter.

Some of the problems and developmental tasks which the adolescent faces in taking his place in the culture have been discussed in earlier chapters, particularly in chapters i, v, xi, xii, and xiii. If the school is charged with helping youth to take their place in society, it must of necessity help them in these developmental tasks, which may be briefly summarized as follows:¹

- a. Attaining individuality
 - (1) Progress toward an organized personality pattern
 - (2) An emerging philosophy of life involving a concept of values, desirable behavior, and a place in society
 - (3) An understanding of personal assets and liabilities
 - (4) A maturing of plans for future living
- b. Adjusting to changes resulting from physical growth
- c. Securing satisfying relationships with age-mates of both sexes
- d. Establishing independence from family

¹ For a comparative analysis, see references 3, 10, 14, 21.

- e. Attaining adult status
 - (1) Vocational plans
 - (2) Family relations
 - (3) Social relations
 - (4) Citizenship

While the accomplishment of these developmental tasks is certainly not the only goal during the adolescent years, the preoccupation of students with working out their individual problems influences their reaction to all aspects of the school's program. This places an additional burden on the school to make its offering meaningful and challenging. Naturally the secondary school, or Grades VII through XIV, is the level at which the adolescent group will, for the most part, be found.

2. Operating Guides

If this brief statement of the developmental tasks of the adolescent be accepted, two operating conditions in the school are necessary for the adequate performance of its functions.

- a. The school must study the adolescent in his social environment. As has been emphasized throughout this volume, the determination of what constitutes wholesome development, as well as the facilitation of growth, necessitates the consideration of the adolescent in the light of the situations through which and toward which he is moving. If schooling is to be effective in aiding youth to grow toward desired ways of living and behaving, it is imperative that each individual be viewed in relation to his total environment and that he be worked with under normal, natural, life-like conditions.
- b. The school must provide a program which is flexible and which is continuously being adjusted to local conditions and to the maturity levels of its pupils. A program of education which really serves adolescent needs will of necessity be in harmony with the nature of specific individuals and their developmental tasks.

On the basis of these assumptions and beliefs as to the purpose of public education in relation to adolescence, suggestions have been made concerning the activities of teachers and counselors. While the importance of unity of organization is recognized, for our purposes it will be convenient to consider separately each of several aspects of the school's work. The following have been selected for special treatment.

- a. Understanding and guiding the adolescent
- b. Instruction through regular classes
- c. The program of pupil activities

- d. Contact with out-of-school groups and agencies
- e. Relationships with children and adults

Under these five headings some of the experiences, relationships, and conditions which will foster the wholesome development of boys and girls will be presented. Obviously, there is much overlapping, since the influence of an educational program cannot be broken down on this basis. For example, instruction through regular classes relates to each one of the other topics. Also, the objective or purpose underlying each of the five areas is much the same. Nevertheless, there are guides which can be set up.

II. UNDERSTANDING AND GUIDING THE ADOLESCENT

1. The Necessity for Knowing the Adolescent

Logic suggests that knowledge and understanding of the adolescent are basic to any action seeking to facilitate his development. The earlier chapters of this volume confirm this by revealing the many possibilities for a misinterpretation of adolescent behavior by one not cognizant of the problems he is facing. Fundamental to any program of schooling which seeks to guide the development of boys and girls intelligently is a knowledge of the chief characteristics of the adolescent and the means of recognizing and interpreting accurately the symptoms and evidences of normality and abnormality. Obviously, the wise planning of programs of instruction and the giving of helpful counsel and advice are predicated upon a thorough grasp of the processes through and by which individuals pass from childhood to maturity. However, familiarity with the studies of adolescence is not sufficient. Throughout all of these reports there is one outstanding fact, namely, the absence of a typical or universal pattern of adolescent behavior. While the materials presented offer an excellent background against which development may be analyzed and offer immeasurable help in securing an understanding of individuals, they do not obviate the need for systematic study of the particular boys and girls who are to be aided. The diverse character of adolescent behavior and the variable needs of youth of this age signify the importance of continuous analysis of their problems and of working with them as individuals.

2. The Difficulty of Knowing the Adolescent

In the secondary school the typical plan of organization makes it difficult to know and understand the adolescent. As noted in chapter xii, in several important respects teachers show a decreasing knowl-

edge of children as they move upward through the grades. This is partly due, of course, to the tendency of adults to hold certain standards for youth which are not operating in the lives of the boys and girls concerned. Adolescents develop their own standards and codes to guide their behavior; and what is more complicating, these standards shift and change as children mature. The lack of any set pattern of development for all adolescents, as well as the ambivalent character of their behavior, call for insight and care in interpretation. Those who are overly inclined to accept behavior at its face value, or who react personally to things which adolescents say and do, are likely to be unable to understand what they observe. The fact that at certain stages many adolescents become openly antagonistic to adults in their effort to establish their independence, only increases the problem of coming to know them. Outbursts of temper may be regarded as evidence of unco-operativeness or of wilful disregard of responsibility when in reality they may be a result of a feeling of insecurity or a reaction against dominating tactics on the part of parent or teacher. From many standpoints there are real difficulties in coming to understand the adolescent. Untiring efforts are often required.

3. Information Which Is Significant

As previous statements imply, the school has broad goals in view; the individual boy or girl is facing specific developmental problems. In defining the functions of the school, effective guidance and direction of youth's developmental experiences are contemplated. If this assistance is to be intelligent, the social and individual goals of the school must be clearly perceived, the levels of aspiration of the adolescent personalities must be known, and the progress of each individual must be assessed from time to time. The teacher may discover what information is significant by examining results from the direct study of boys and girls in terms of case materials² and also in terms of generalizations such as those presented in earlier chapters of this volume. Knowing the general characteristics of individuals and the diverse courses by which they move from childhood to maturity; knowing also the developmental tasks of adolescents and the ultimate goals for which the school is established, a frame of reference is provided for studying the individual pupil. The following section will outline methods by which the teacher, under appropriate conditions, may conduct such a study.

² Cf., for example, references 1, 12.

4. Collecting Information as an Aid to Understanding and Guidance

The great variety of youth problems, the range of situations in which they are revealed, and other difficulties in coming to know secondary-school boys and girls, suggest that various means must be used in collecting information. Undoubtedly there has been an over-emphasis on tests and record cards of one kind or another. The mechanical ease with which these devices can be employed lends a certain appeal in spite of their sometimes having little practical value. Certainly they can be helpful, but not without more care and interpretation than is frequently given. Of the numerous other approaches which have been used in practical school situations, each has its particular contribution.

a) *Individual Interviews.* Interviews and informal conversations are most useful in revealing the characteristics of the adolescent. Working and living with students as they go about their daily activities is, of course, the best way to gain an understanding of the individual—his likes and dislikes, fears and hopes, and his basic-value patterns. This requires that classroom teachers, guidance-workers, and principals operate on a more leisurely schedule than is normally found. Opportunity must be provided for talking with boys and girls under free and unhurried conditions.

In addition to maintaining free and normal life-like relations within a school, planned conversations or interviews should be provided. The skilful use of this device is certainly one of the most valuable means of gathering information and coming to know the individual. However, careful planning is essential to the profitable use of interview time. The purpose of the interview should be clearly established and proper records made to enable the interviewer to analyze and relate the information gathered to facts secured from other sources. Hit-or-miss, aimless conversation will not provide an adequate basis for objective, accurate evaluation of the individual. Conversely, the careful use of this technique may give excellent results. The interview, supplemented by observation, especially in unsupervised situations, brings together two of the most useful means for obtaining a knowledge of adolescents.

b) *Observations.* One who thoroughly enjoys being with adolescents is fascinated by what they reveal about themselves with every action (5, 11). Interests, drives, and expressive activities provide important clues to the individual. Although frequently difficult to de-

termine, the basic-value pattern of the boy or girl is vitally important for future guidance.

With the many pupil contacts of the normal school situation, it becomes difficult to form a complete and accurate picture of any but the most unusual individuals without a partial formalization of the observation procedure. A record of behavior—a sentence or paragraph describing a situation in which Malcolm or Sandra figured prominently—helps to build an account of individual reactions under varying circumstances. This can be studied at a later date away from the complexity of an active social situation. Various incidents can be related, contrasting reactions noted, and a more complete and accurate picture of the individual secured. Such a record permits an approach to determining interest patterns, fundamental motivating forces, typical social behavior, and characteristic expressive activities.

c) *Interest Questionnaires*. For a systematic analysis of the interests of groups, or the diagnosis of individual patterns of response to activities and conditions, interest questionnaires are exceedingly useful. The suitability of the inclusion of certain broad areas of instruction in programs of general education can be partially validated on the basis of results from such a questionnaire. Commercial instruments can frequently be found covering a range of problems which renders them suitable for use with a particular class. Another group device, closely related to the questionnaire, is that of soliciting anonymous responses to questions or situations. This will frequently provide information of great value in determining appropriate goals of instruction as well as methods to be used.

d) *Autobiographies and Diary Records*. Once suitable student-teacher relationships have been established, adolescents can be encouraged to write autobiographies and keep diary records. With confidence in the teacher and with proper direction, they will frequently write with amazing frankness of their hopes and ambitions, their philosophy of living, and their important experiences. This can be one of the most useful and revealing sources of information. It involves, however, an unusual degree of responsibility on the part of the teacher and should not be undertaken by teachers who are psychologically untrained.

e) *Class Discussion*. Closely related to the techniques already presented is the class discussion. If wisely used, with the introduction of varied topics relating to adolescent problems, it may provide an important medium for communication between teacher and pupil. Certain individuals through their silence will tell little about themselves

other than that they are reluctant to talk in group situations. Many, on the other hand, will raise questions and offer comments which (when considered in the light of other information) will help the teacher to understand some of the difficulties which they are encountering.

f) *Staff Conferences.* Consultation among the several members of a staff group who work with an individual student can provide an exceedingly revealing experience. Varying reactions of an adolescent to differing situations are frequently discovered. One staff member will have an explanation of behavior which had not occurred to others. A teacher of a subject of particular interest to the student may have discovered suitable approaches in working with him that others had not found. One teacher may have observed a student at work in the community, another faculty member may have conferred with the student's parents, a third teacher may have been associated with this same student on a committee. Only as each staff member comes to see a student in a variety of these situations can he truly know and understand that student's problems. In planning a program or a co-operative course of action in relation to an individual, it should be evident that a consultative review of his record will be of value.

g) *Conference with Parents.* Obviously parents are an important source of information. They are able to see their children in relationships unknown to teachers or community workers. They have hopes and ambitions for their children and have methods of working with them which frequently explain a child's reactions. Nursery-school and kindergarten directors have long recognized the importance of contacts with parents and have frequently arranged for detailed interviews and conferences. In the adolescent years similar consultation would be of at least equal value, in view of the fact that many of the problems of adolescents center in the home and in relationships with parents. Such conferences require special planning by school authorities.

h) *Observation of Home Conditions.* It is frequently possible to arrange conferences with parents in the home. This has a special advantage, in that observation of home conditions may provide essential information about individual problems. The boy and girl who are ashamed of their home, those who have no place of their own for work or play, and those who are victims of a disorderly home are samples of types of individuals who can be helped best if the home conditions are really known.

i) *Surveys of Out-of-School Activities.* One of the very helpful aids in understanding an individual's behavior is a knowledge of his

out-of-school activities. This may include leisure time, home responsibilities, community service, and employment. Such information may help to explain some developmental problems and may also suggest possible means of solution. Moreover, a record of home, community, vocational, and recreational pursuits is necessary to sound planning for the group as well as for the individual. Guidance and curriculum planning should rest upon such basic data. The range of a specific group experience may well suggest an addition to or elimination from the curriculum. Such surveys need not always be based on a carefully developed questionnaire, the results of which must be laboriously tabulated. A carefully planned theme dealing with outside activities may be more revealing than an inquiry blank.

j) *Observation and Interpretation of Community Influences.* Closely related to the gathering of information on nonschool activities is the observation and interpretation of the way in which community life and conditions affect boys and girls. It is not enough to know what the student does with his time. The influence of activities is also important. The kinds of recreational activities engaged in, the reaction to motion pictures seen, the results of part-time work; all these should be known.

5. Recording Information for Use in Counseling

If records are kept, they will undoubtedly include items not already mentioned: grades, attendance records, aptitude and achievement test scores, and reports of physical examinations. This information can be useful especially when related to other observations of the individual. A good student of superior ability, but in poor health, who has great difficulty in gaining the acceptance of his peers, may present a problem very different from that of an equally able student, but of perfect health, who is also unsuccessful in winning the approval of his classmates. The importance of comparing various kinds of information suggests that cumulative records should provide a cross-section picture of the many factors which are known to influence the development of an individual. A second type of picture which cumulative records should give is the long-range view—the history of the individual. Is his record one of continuous difficulty or one of consistent progress? These facts are definitely worth knowing.

While there are many excellent cumulative record forms available, most are deficient in two respects. (1) They do not include actual samples of the student's work such as compositions, reports, and drawings. (2) They do not include the personal type of report which re-

veals the kind of person being described. Usually there is no place to record anecdotes and observations.

The first problem is rather easily handled if proper filing space is provided and faculty co-operation is secured. To meet the second problem, however, most schools will find it necessary to work out a special form to supplement the usual cumulative form. In doing this, the first problem will be one of selecting items on which data are to be recorded, or items which are to be stressed in building case records. For the secondary-school years these might well be centered around the developmental problems of adolescents. Second, some plans will have to be evolved for collecting information and recording it. Third, some plan for insuring that the findings will be used should be established. Cumulative records are of no value unless a way is found to encourage staff members to utilize them in securing a better understanding of individuals and in planning more effective programs.

6. The Function of the Counselor

There are two ways of working with boys and girls—individually and in groups. Both approaches, to be intelligent, must be based on clearly defined goals, a knowledge of the persons concerned, and skill in directing child development. For purposes of this discussion, work with individuals is thought of as teacher counseling. Since no specialized psychiatric training is implied, it should be understood that there are definite limitations to be recognized in planning what a counselor should attempt to do.

a) *The Counselor Should Help Establish and Clarify Goals.* Guidance activities, both individual and group, have too frequently overlooked the importance of the student's goals. It is impossible for a counselor to function effectively without a clear knowledge of the adolescent's hopes and expectations. Probably the first task, and the major one, is to help youth establish their goals at appropriate levels. For the great mass of students in the American secondary school this is the foremost problem. Unless each boy and girl has his goal fixed at an appropriate level, little can be done to help him. This is a serious and difficult problem for most teachers, because they fail to understand what it is that motivates certain segments of the student group. Having come from homes of a middle-class level, and having spent most of their lives in schools where middle-class values predominate, they have not fully sensed the contrasting background of those youth who are identified with one of the extremes of the socio-

economic scale. Further, little is known about techniques and methods for changing the goals and value patterns of different classes of youth. Nevertheless, this becomes a first concern in any guidance activity.

b) *The Counselor Should Encourage Planning to Attain Goals.* Once goals are known and established, the counselor's role is that of helping to clarify and make intelligent the goal-seeking activities. Some goals will start as mere hopes which may not at first be too clearly defined. Only as informed and planned action is taken to delimit and attain these hopes will the outcome be satisfying to the individual and socially sound. Civic participation, social activities, family life, and a vocation require that appropriate goals be established and that individuals work to attain these goals. Although, as will be shown later, students can receive this kind of help from group activities, to a large extent reliance must be placed upon individual counseling which leads and stimulates but does not coerce.

c) *The Counselor Should Facilitate the Accomplishment of Developmental Tasks.* As has been stated, the normal, adolescent developmental tasks involve attaining individuality, making plans for future living, adjusting to changes resulting from physical growth, securing satisfying relationships with age-mates of both sexes, establishing independence from family domination, and achieving adult status. The teacher-counselor with a knowledge of these problems and of the ways in which they are worked out by students in the secondary school, can render significant help, (1) in preventing failure in performing these tasks, or (2) in overcoming maladjustments which may occur. As has been shown in chapter xii, developmental tasks which are not accomplished successfully are likely to leave the boy or girl with a lack of readiness for further development and for the tasks which the school imposes. Those who are retarded are branded as out of step and queer. Those who start working on a problem long after the majority of their peers have solved it, once again appear to be unusual. Prevention or early correction of failures of this type is an important responsibility of the counselor.

d) *The Counselor Should Help Interpret the Adolescent to His Parents.* The problems involved in the adolescent's breaking away from home and establishing his independence can frequently be minimized and solved through the efforts of an informed, understanding counselor. Later sections will deal with this question in some detail.

e) *The Counselor Should Interpret the Adolescent to Teachers.* Many teachers still fail to recognize the symptoms of an adolescent's struggles with his developmental problems. An informed counselor

can frequently aid in securing faculty understanding and suggest methods for working with a particular individual.

f) *The Counselor Should Inform the Individual Student of Resources.* The school and community will offer many opportunities which will help the student to attain his goals. These may vary from subjects offered in school to work experiences or a community band. Although much of this can be done on a group basis, personal help is needed in relating opportunities to specific needs, selecting those activities of greatest value, and utilizing resources and opportunities in the fullest way.

g) *The Counselor Should Guide in Evaluating and Planning.* The importance of goals and careful planning to attain goals necessitates the making of many choices and evaluations. Adolescents can frequently be aided in making sound evaluations. Most important, of course, is the development of techniques of evaluation, as well as the ability to use various sources of help whether they be books or citizens in the community. Only in this way will students be able to operate independently, once they have left the school.

h) *The Counselor Should Recommend or Approve Individual Adjustments.* Individual students may need financial assistance, a heavier than normal schedule, a rest period, or any one of a number of special considerations. The teacher-counselor who has studied the student and knows him best should be able to suggest help which is needed. He is also in a position to pass judgment on the recommendations of others.

III. INSTRUCTION THROUGH REGULAR CLASSES

1. Preliminary Considerations

In attempting to suggest in general terms the potential significance of classwork for adolescent development, there are certain limiting factors or basic considerations which should be recognized.

a) *The Importance of Timing.* Timing of instruction is exceedingly important. That which might be recommended for one group may be undesirable for another. What is more complicating, all individuals within the normal class group may not be ready for the same instruction at one time. Certain types of experience should, therefore, be provided for various age or class groups according to their maturity.

Upon entrance to the seventh grade most students are interested in activities of the shop, laboratory, or classroom. Only a few are particularly conscious of themselves or their relations with others.

By the eighth or ninth grade a stronger social interest develops, in many cases to the exclusion of former concerns. For some boys and girls, however, this social concern does not appear until later.

By the time they reach the eleventh and twelfth grades many adolescents, particularly the girls, will have made more or less satisfactory adjustments with their age-mates and will recognize their need for several of the school's offerings. Many will have a strong interest in themselves, their beliefs, their purposes, and their future. Some will become very much occupied with intellectual activities. A few will arrive at their highest level of interest in serious study. A considerable number of the boys may not arrive at this stage of maturity until the thirteenth or fourteenth grade.³

b) *The Significance of Success in Adolescent Adjustments.* This emphasis upon sequence in the development of adolescent interests in no way belittles the value and importance of the specific subject-matter fields offered by the secondary school. It does suggest the nature of the preoccupation of many students during various periods. Success in school courses will depend, in large part, on the extent to which boys and girls are making satisfactory progress with their developmental tasks and thus maintaining a feeling of security.

c) *The Need of Increased Differentiation.* During the late secondary-school years, from Grade XI through Grade XIV, there is a need for greater differentiation than is frequently found in school programs. Support for this proposal can be seen in the range of interests of the students as well as in the pace at which they are ready to work. The offerings for boys and girls should have greater diversity in terms of sex interests and future activities. Girls destined for early marriage might well have experiences differing markedly from those provided for boys going on to school and to industry. Girls going to college might well take work which is unique, in some respects at least, when compared to that provided any of the groups already mentioned.

d) *The Importance of the Teacher.* While special courses may be given to meet adolescent needs, as will be suggested, much can be done through regular classes. Under some school situations, the organization of a new course may be the best way to adjust the offering. The most important factor, however, is the teacher. If he has real insight as to the influences operating in the lives of adolescent boys and girls and understands their motivation, and if he is recognized as a leader by them, instruction will usually be well handled.

³ Cf., chaps. ii, iii and iv, dealing with individual differences in maturing.

2. The Development of a Personal Philosophy

One of the tasks of adolescence is the attainment of a philosophy of living, that is, a system of values by which to live. Personality patterns are pretty well formed by the time students reach the secondary school. However, they are a long way from maturity. The place of the individual in the whole of life activity is a natural concern which is frequently observed when adolescents are about fifteen to eighteen years old. This interest can easily be stimulated and encouraged to the point where real assistance is given the student in testing and checking his views. The school can help immeasurably in developing meaningful concepts in respect to the purpose of life and the place which each person can fill. While much will be learned from living with others, the school should encourage a realistic view of life and foster a sound interpretation of what is observed and experienced. The science teacher, who is able to view his subject in its broad relationships, will be able to do much to secure an understanding of the modern scientific concepts of the nature of the world and of man. Teachers of English can use literature to interpret the meaning of human life. Through composition they will find it possible to stimulate the formulation and clarification of points of view. Opportunities are open to all teachers to help create an awareness of the consequences of human action. In a social studies class the following simple procedure was used. Each student was asked to state his "philosophy of life" in terms of a motto or a few brief statements such as, the greatest good for the greatest number, or the golden rule. This was followed by several months of study and work in which the views and beliefs of authors read were analyzed and criticized in terms of their consistency, their agreement with those of the reader, and their harmony with the ideas of others in the class. As news notes and editorials were read, the question was continually raised, "What is your view?" "Is it consistent with your stated motto or guide?" The results of this technique heightened interest and resulted in a clarification of viewpoint on the part of many.

Closely related to the task of developing a personal philosophy, and probably one phase of it, is the acquisition of an understanding of personal assets and liabilities, and the maturing of plans for future living. Courses in occupational orientation may help the individual considerably in clarifying his role in respect to occupational life (Cf. chapter xiv). Units in social problems or English courses dealing with emotions, recreations, occupations, personality, human relations, and similar topics can increase a youth's understanding of him-

self and his role in life. In recent years a number of excellent texts have appeared.⁴ While this is a new area for classroom study, and much experimentation is needed, promising starts have been made in providing student materials.

3. The Development of Common Loyalties and Values

In a school serving a democracy there is of necessity a concern with democratic values. Social cohesiveness is dependent on a widespread allegiance to certain fundamental ideals and the maintenance of many common understandings. Unless such conditions exist, the social group faces a hazardous future.

The natural social interest of the adolescent, as well as his concern with personal values, gives opportunity to instruct effectively in the democratic tradition which defines the fundamental values by which we as a people live. When democracy is viewed as a way of life, a process for arriving at truth, and the greatest good for the greatest number, it can well be an object of indoctrination. Government by consent of the governed, respect for the rights of minorities to seek to become majorities, freedom of speech and of press, a willingness to work and sacrifice for the common welfare, and the other ideals which characterize our emerging concept of democracy, provide a basis for evaluation and choice in the social realm. The forms and institutions of democracy can well be examined for their harmony with fundamental democratic values and the extent to which they foster democratic living. Classes in English and in social studies furnish an opportunity to give adolescents a realistic understanding of social conditions and of their relationship to individual development. If the enthusiasm of youth results in a desire to "do something" about the conditions discovered, the opportunity to harness and direct these energies into channels of action suitable for the particular community should not be ignored.

Only as students *live* democracy will they come to know its true meaning. One of the greatest contributions in this area can be made through experiences in democratic living in school classes. This necessitates flexible procedures and work in small groups where all can have opportunities to participate and contribute. Teacher-student planning, student purposing and planning, student evaluation—all these are elements. As groups work and share, it is highly important that their living of democracy be raised to the level of consciousness, not by

⁴ See references 4, 7, 8, 9, 15, 17, 19.

preaching and overemphasis by the teacher, but through suggestion, indirect comments, and the handling of students' observations on what they are doing.

In developing common loyalties, it is more important that youth come to have some common goal and task to which they give support and allegiance. As they accept and cherish certain ideals, see the opportunities for rich and satisfying democratic living in America, recognize the pressures, problems, and difficulties in building a satisfying way of life, and sense the importance of action by the people as a whole, they will come to have a feeling for the task and the problem which we as a people face. Schools must go beyond this, however; they must help each student to see how he can act, how he can contribute. The democratic process and the place of the individual in that process, must be made sufficiently clear so that each person comes to see how he can be effective. If this is not done, cynicism and discouragement are likely to result.

4. The Major Personal Adjustments of the Adolescent

The adolescent has at least three tasks or hurdles which must be successfully met if he is to make normal progress and become a mature individual. These involve adjusting to changes resulting from his physical growth, obtaining satisfying relationships with age-mates of both sexes, and establishing independence from his family.

a) *Adjustment to Changes Resulting from Physical Growth.* While classes in biology and hygiene should present students with the facts of physical development, there is much more that can be done. In addition to revealing what constitutes the process of growth, normal variations and differences should be emphasized. Other classes besides those in biology may well contribute. Courses in psychology, orientation, personal development, general science, home economics, or physical education can be of assistance. Posters and charts on height and weight distributions by age groups can tell part of the story. Various diagrams can help to convey the idea that "normal" is no one condition or size. In connection with studies of foods or clothing and on problems of diet and grooming, home economics classes have good opportunities. Physical education classes have an unusual chance for discussion and direct teaching on any phase of the physical-growth problem which may be of interest to a particular sex group. Art classes can well draw and model the human body. A consideration of body form can help to reduce strain and tenseness and at the same time give opportunities for matter-of-fact discussions of body differences.

Dramatics can give help through developing poise and overcoming the concern which some pupils have about such differences.

While teachers in many subjects who are aware of the problem can do much to help, each school should provide some place in general science or biology classes where direct teaching can be provided. Instruction in the facts of physical development, including body changes, physical and emotional reactions, voice changes, sex development, and similar topics, should be given all students. If proper curriculum provisions have been made through the elementary grades, this will present no difficulty. If attention to this area has been neglected up to the secondary-school period, a more careful approach must be made. Obviously the timing of instruction in this area is all important.

b) *Experiencing Satisfactory Relations with Age-Mates of Both Sexes.* Undoubtedly adolescents can be helped best with this developmental task if the classrooms, clubs, and playing fields provide the atmosphere which is conducive to social experimentation and the free development of social abilities. However, the importance of the classroom is usually overlooked. Many children because of their home background have little opportunity for rich social experience. This is even true of many children from homes of higher economic levels. Lack of social activity on the part of parents, shyness on the part of the child when he enters school, home chores and responsibilities, outside work, and similar factors combine to prevent a great many individuals from ever making an appropriate adjustment. The fact that a school has social clubs or a few dances a year does not meet the situation. Even if all students attended these affairs, and they do not, the experience would not be sufficiently extensive. Much free social activity is necessary.

For those who need it and can profit from it, schools should provide direct instruction which will contribute to social competence. There are several items which are essential to even a minimum program.

First, all adolescents should have training in the basic skills required for everyday social activity. How to meet people, how to introduce friends to other friends and to parents, how to order food—these and other seemingly insignificant matters can be of great importance in building poise, assurance, and self-respect. Social dancing and its accompanying problems of how to ask for a dance, how to decline or accept a dance, and how to leave a dancing partner should find a place in almost every curriculum. There are also many important skills of social usage centering around the preparation, serving, and eating

of food. A very large number of abilities involve personal appearance: grooming, clothing selection, hair styles, cosmetics, and clothing care, repair, and construction. In later adolescence personal attractiveness often becomes a very significant factor in peer relationships.

It is particularly vital that boys reach a certain minimum level of proficiency in physical activities. As pointed out in chapter vi, poor performance in sports and games tends to undermine the respect of age-mates, and to influence adversely a wide range of relationships. Many boys need special help and encouragement, but it must be given without attracting too much attention. In our present mass programs of physical education, many boys fail to develop these abilities adequately.

Second, all students should have maximum opportunity to gain proficiency in the fundamental classroom skills. The secondary schools dare not assume that these are cared for in the elementary school. By the time of arrival in the secondary school, many students are painfully aware of deficiencies in reading, arithmetic, and writing. They are eager for help if it can be secured without personal embarrassment. Schools must, therefore, find ways of stimulating students to seek help, and of providing it without unnecessary segregation. Certainly no large part of the day, and hence no long period of segregation should be necessary for special help in these areas of deficiency.

Third, every student should have facilities for studying human relations. While this is no substitute for the direct experience of living and working with others, directed study can do much to increase understanding and to facilitate the working out of social arrangements. There is a natural, growing interest in human relations as adolescents mature. Certainly this interest can be utilized in helping them to interpret their own experiences. Instruction should not be abstract or remote. Instead, it should deal with problems students are encountering in day-to-day living. Many times high-school Seniors will be more interested in studying a topic such as "How to get along with others" than anything else which they or the teacher can suggest.

If students can come to see many of their problems and those of others as symptoms of fatigue, fear, worry, frustration, and sometimes as reactions to another person, they will have important understandings for their personal lives and their future relationships.

Fourth, all students need opportunities to build special competence which may give them some claim to distinction or uniqueness. This may involve opportunity to excel in a subject field: shop, physical education, home economics, or a foreign language. Unfortunately,

most schools are not organized to stimulate this development in ways socially acceptable to students. Merely working for grades is usually damaging to peer relations. However, special competence in music, art, writing or almost any area will often be an important means for securing satisfying peer relationships. While the outstanding nature of the individual's work may be a factor, there are other advantages. The student who has a special interest has something he can talk about. He is able to assist others; he feels important, and participates more easily. Ordinarily, some of these gains will be reflected in activities outside the field of special interest.

Fifth, all adolescents should have opportunities to discuss and study boy-girl relationships under competent leaders. Not only is there a great natural interest, but also there is a need for a satisfactory answer to adolescent questions in this area if subsequent problems of marriage are to be adequately solved. Experiences in working and associating socially with the opposite sex are highly important, and much can be provided through class study. The significance of various characteristics of friends, bases for a happy marriage, and many similar matters are of general interest. Providing opportunity to discuss such problems facilitates intelligent later action and consideration.

c) *Establishing Independence from Family.* Undoubtedly establishing independence from parents is one of the important developmental steps of adolescents as shown in chapter xiii. It has numerous aspects and profound implications for future home life. To reach maturity and establish his individuality, the adolescent must assert his independence. In so doing, serious difficulties with parents frequently arise. In an appropriate classroom situation, consideration of some of the problems involved can frequently clear up difficulties and release many tensions and worries resulting from disagreements with parents. Classes dealing specifically with family relations and courses in literature, home economics, and social studies can usually assist students in analyzing reasons for the conflict between generations and in suggesting ways of harmonizing differences.

With parent help and co-operation, many schools have given direct attention to problems which students are facing: a place to study, a room of their own, the right to listen to the radio, dating on week days, the use of the family car, and similar problems. Home projects planned with close parent co-operation have sometimes been the solution for such problems—redecorating a room, arranging a place to study, planning a party, and similar ventures may provide a situation through which many minor difficulties can be eliminated.

Several approaches can be made to the study of family relations. Personal problems of students, historical studies of changes in the functions of the home, panel discussions in which parents are represented, plans and ambitions of students for their own homes—these and many others have merit as ways of starting a study of this question.

5. The Attainment of Adult Status

The goal of adolescent development is maturity. The school seeks to foster a kind of growth which through its wholesome, balanced nature, at each step of the way, will lead to personally satisfying, socially desirable adulthood. Schools have accepted this function, although sometimes in a vague and faltering manner. In their well-intentioned desire to pass on the racial heritage, teachers have frequently become lost in the minutia of lessons to be studied and recited upon. The broad sweep of life processes has not been seen by the teacher or the student.

The satisfactory handling of developmental tasks is essential, but in addition, the adolescent must get an integrated view of his aims in life and develop his plans in vocational, family, social, and citizenship areas. Many schools appear to have made progress in helping to give students a more unified view through a problem organization of instruction. Some have planned school programs around major areas of living such as home living, leisure activities, citizenship, and vocational life. The setting aside of a core or central strand of experience to serve as an integrating element in the total program has much to commend it. However, much more experimentation is needed before this problem will be adequately solved.

The importance of occupational orientation must not be minimized. This is one of the most important decisions an individual makes. Personal and social plans, family life, and all adult activities are very largely conditioned by the vocational life of the individual. All phases of instruction should seek to contribute to vocational orientation and preparation, but definite provision should also be made to give instruction in the bases for occupational decisions. Work experience is important for both orientation and general job training. Assurance that one can make a living becomes, in our society, a real test of maturity.

Adolescents have idealism and energy. Their search for adulthood is pressed with vigor and enthusiasm. Those in charge of education have the responsibility of maintaining this enthusiasm, giving it real

outlets, helping to reveal its power, and preserving it thereby for adult citizenship.⁵

IV. THE PROGRAM OF EXTRA-CLASS ACTIVITIES

1. Basic Considerations

a) *Definition of Terms.* The term, extra-class activities, is used to include the many clubs and informal activities which are organized outside the usual schedule of courses. Social and interest clubs, student-body organizations, and athletics suggest the range of opportunities in many schools.

b) *Neglect of the Program by Professional Staff.* Although a very significant part of a school's curriculum, these activities are seldom given adequate attention from the professional staff. Preoccupation with teaching regular classes usually relegates the extra-class program to a secondary position in spite of the fact that it may be, for certain individuals, the most important educational influence which the school provides. This neglect is revealed in two ways. First, many programs obviously lack planning in terms of the interests of the total student body. The prominence of sports, social, or other activities is frequently apparent. Cliques within the student body, and occasionally alumni groups, dictate what is done. In many situations there is little evidence of a carefully planned, flexible program built in the interests of the total student group. A second sign of neglect, which may be but a corollary of the first, is the infrequent recognition of extra-class activities in the guidance program. Seldom are these activities planned in terms of meeting the needs which individuals are known to possess. Seldom are an individual's activities modified in terms of what the program is or is not doing for him.

c) *Potential Values.* Of the many values in extra-class activities the one which probably stands above all others is the potential contribution to the immediate social development of adolescents. The natural interest of adolescents in peer relationships is a basic reason for the whole development of extra-class programs. All of these organizations and activities, because of their informal basis and their relative freedom from adult restriction, provide opportunity for social experimentation. Participating with members of the opposite sex in purely social as well as in other more specialized activities has its real advantages. Offices, chairmanships, and special assignments which give prestige are

⁵ Cf., references on the subject-field contributions to adolescent development: 6, 13, 16, 20.

provided. With no set program of ground to be covered, they afford opportunity for specialization and distinction in some area of interest. Often the activities are such that a large social group can be reached; athletics, dramatics, the newspaper, and the school yearbook provide the possibility of gaining recognition from many classmates. In addition there is a certain realism about extra-class activities which seldom can be achieved in the regular courses. Students are busy doing something which is important, they are contributing, they have a stake in the success of an adventure which is real and tangible.

Many young people view these activities as opportunities to try themselves out. They discover how "good" they are in dramatics; they find out whether or not they can sell advertisements for the school paper; they see if they can make the tennis team.

Citizenship values are also a reasonable expectation. With appropriate adult guidance, activities can do much to develop common loyalties. Democracy in operation can well be experienced through an activity program if all concerned will hold this as an important goal. Group action and sacrifice for a common cause can take on reality with a stimulating program in which students have freedom to plan and do.

Adolescents naturally want to be independent grown-ups. A properly organized program enables them to make significant progress in this direction. Here they are able to function with a measure of independence from their families, but still under guidance. They can test themselves in real life situations calling for social abilities, civic leadership, and in some cases economic responsibilities of real importance.

d) *Importance of Basing Programs on Pupil Needs.* Any program of extra-class activities, if it is educationally sound, should be firmly rooted in the needs of a particular group of students. This necessitates a knowledge of individuals and of the total school and community offering. For example, most seventh- and eighth-grade children are interested in manipulative activities, games, and free play. Twelfth- and thirteenth-grade students prefer more quiet, sedate types of relationships such as dancing, discussions, or possibly well-organized games. Further, all students in a particular school may be on such an economic level that they have had unusual opportunities for a variety of social activities. It is more likely, however, that many will have had very limited social experience and will be able to profit from a school-sponsored program.

The total community provision for adolescents must also be viewed.

Commercial recreational facilities may be abundant. Churches and welfare agencies may have rich offerings which meet many of the needs of the total group. As the institution which contacts the largest proportion of the youth, the school is in a position to study the total situation and co-ordinate educational efforts.

e) *Importance of Parent Co-operation.* Some activity programs have encountered active opposition from parents because the programs have not been understood. When parents are familiar with the school's objectives they can contribute in numerous ways. Where pupils are not in open rebellion against their homes, parents can give valuable informal guidance as interested observers of these outside activities. In other situations they may contribute through direct participation. Trips and excursions, and all types of social activities offer opportunities. Of course, adults should not be included against the wishes of the adolescent group. At certain ages they will object. At later times, when they feel more secure, they will want to include them. Many students need the experience of mingling freely with adults of varying backgrounds. The activity program may be one way in which this can be done.

f) *Scheduling Extra-Class Activities.* The time given to extra-class activities may be an important consideration. Some teachers and administrators are of the opinion that if they can crowd all activities into a thirty-minute period on Monday, Wednesday and Friday mornings, they have done away with the need for after-school work for the teachers and have provided automatically for every student in school. Unfortunately, the task of education and guidance is not that simple. It should be obvious that many values may be lost if an attempt is made to crowd all types of activities into a short period.

This does not imply that provision should not be made for some activities during the school day; many activities can well come within the day's schedule. Some could as well be elective subjects as extra-class activities. Every opportunity should be made to see that appropriate provision is actually made for the desired student growth. Many types of social activities, such as dances, can be successfully held at noon or after school. However, these do not have identical values with an evening dance. Many similar comparisons and contrasts could be noted.

In rural areas, or in schools where students are transported, it is frequently impossible for any to remain after the closing hour of school when busses leave. Farm chores may occupy the student's time before school in the morning and in the late afternoon and evening. Certainly,

in such cases, the school should make every effort to provide a rich program of activities within the scheduled day. The needs of students should be the basis of planning, and maximum use should be made of whatever time is available to stimulate and guide their all-round development.

g) *Importance of the Teaching Staff.* Just as for good teaching in any situation, resourcefulness is needed by those responsible for the supervision of extra-class activities. The ends and means relationships may not always be as clear in the activity program as they appear to be in regular class work. More insight and study, more close observation of students are needed. A teacher who can see what is happening to individuals and who can guide through his ability to make sound suggestions acceptable to the student group is a necessity. Certainly flexibility as well as continued interest in adolescents is essential.

2. Values in Various Types of Activities

a) *Social Activities.* Throughout this volume the need for socializing experiences has been repeatedly mentioned. The development of satisfying peer relationships with those of the same and the opposite sex is a developmental problem with which adolescents are very much preoccupied. There is some tendency to think of social activities as ranging from parties characteristic of the junior high school age, consisting of free games which may border on "rough-housing," to the parties of senior high school students more exclusively given over to social dancing. Some schools have annual class dances and assume that these constitute a satisfactory program. Here, as elsewhere, it is essential to consider the needs of the total group. Social dances, as such, may provide for but a small proportion of the student body. Others may be reached through picnics, hikes, skating, and swimming. In some communities where the range of social experience is limited, all of these and other possibilities should be canvassed. The values in "small talk" before school, at noon, and after school should not be minimized.

When school clubs are organized for social purposes alone, they frequently lead to difficulties. It is but natural that like-minded students should want to band together. However, the purely social organizations frequently become exclusive in respect to membership and are fraternities or sororities in practice if not in name. Intense loyalty to the group may be developed. Members may be selected on the basis of their freedom to use the family car or the adequacy of their home as a place to hold parties. Such groups are frequently harmful to the members in that they tend to center all attention on the organization's in-group

or clique. They can be ruinous to the morale of the school, as well as frustrating to those who are excluded from membership. It is not uncommon to find students withdrawing from school because of their failure to secure membership in social organizations.

b) *Special Interest Clubs*. Interest clubs that are not primarily social in nature provide a means of satisfying the desire to belong to a small closely knit group. Photography, astronomy, dramatics, music, art, or any one of dozens of interests may be the bond which brings a group together. Junior high, senior high, and junior college students often find satisfaction in working with such groups. They provide opportunity to develop special abilities. Self-assurance and respect of fellow students are frequent outgrowths. While occasional social functions may be sponsored by such organizations, this is not the principal reason for their existence. With membership open to all who are sincerely interested in the major purpose of the organization, they may represent an important recreational outlet. The relaxing atmosphere and good fellowship of those with common concerns foster a feeling of security and comradeship so vital throughout the secondary years.

c) *Service Clubs*. Organized primarily for the improvement of the school or the community, these organizations offer opportunities for appropriate social relations, usually with those of the same sex. Scouts, Hi-Y, Girl Reserves, and numerous local groups tend to follow a somewhat common pattern. Frequently they devote much attention to the personal development of members. Through discussions, outside speakers, and projects of one kind or another, they focus on character and personality improvement. When these activities express genuine interests of the group, they have a clarifying influence on the adolescent's thinking concerning himself, his role in life, and his future plans. When programs are purely the result of pressure and domination by some well-meaning adult, it is very doubtful that benefits accrue.

Organized as these groups are, to care for the school yard, operate a bookstore, issue a school handbook, conduct assemblies, sponsor a tea for parents, supervise a playground, or otherwise better their school, they provide the occasion for the assumption of responsibility. They give participants a feeling of independence and show them the extent of their ability to manage a variety of situations. Appropriate adult leadership is important, of course, if maximum benefits are to result and students are to progress and improve.

d) *Assemblies*. The potential educational worth of school assemblies is much written about but seldom realized. Frequently mentioned are the much-to-be-desired audience habits, the opportunities to achieve

status by revealing individual talents, and the use of the assembly as a public forum. Probably because it is so much easier to dominate the situation and to do the job alone, busy teachers and administrators seldom permit adolescents to develop their own programs. Faculty members are in charge, speakers are brought in, students are entertained, but the opportunity for adolescent development is lost.

Part of the difficulty undoubtedly arises from traditional concepts of the appropriate procedure for a large group meeting. Also school assemblies frequently include one hundred or more students of varied interests and levels of maturity. Under such conditions anything more than mere entertainment becomes very hard to organize. As a result there is little opportunity for creative dramatics in the junior high school, simple skits on the senior high level, a chalk-talk by a more talented individual, or a discussion of school problems. The size of the audience and the variety of interests demand a relatively finished performance. In contrast, a small group of twenty-five to fifty students can see a play after school and discuss it with the actors and director, with resultant gains to both audience and performers which are greater than if the play were produced before the total student body.

The assembly when properly planned can contribute to the self-assurance and independence of students. Grade groups, or two or three sections of a grade, can do many things through small, informal assemblies which are impossible in a large gathering. The usual large assembly obviously has its values, but the full potentiality of the assembly idea is seldom realized.

e) *Student Participation in Government.* As boys and girls seek to attain adult status and to carry responsibility for their own affairs, every occasion must be utilized to afford the appropriate kind and number of experiences. Class organizations, councils, boards of publications, and similar agencies offer means for growing into those particular adult activities which are so important to our democratic way of life. Experience as members of such groups can give new views and insights on the problems of operating a democratic school.

Teachers and principals frequently fear that students lack the ability to manage such enterprises on any basis other than that of faculty domination; or they may question their own ability to deal with a student body which is so engaged. In such situations students have little opportunity for significant growth. When frequently overruled by adults, they quickly lose interest. Care must, therefore, be exercised in co-operatively defining an appropriate sphere of activity and in encouraging full responsibility on the part of students.

V. CONTACTS WITH OUT-OF-SCHOOL AGENCIES AND GROUPS

In helping the adolescent with his problems of growing up, the school, if it is to play a vital role, must give attention to the full range of influences which impinge upon the student.

1. Relations with Parents

In search of independence, adolescents seek to avoid criticism from their parents by failing to inform them of their various activities. In their endeavor to present an appearance of freedom and independence, they often resent any effort by parents to visit the school, or any passing of information from teachers to parents. Many fathers and mothers fail to understand these changes in their children, and manifest attitudes which only serve to intensify the difficulty. Teachers sometimes contribute to this conflict by disregarding the concern of the parents and by failing to recognize their natural interest in their children. Certainly there are many aspects of a student's school activity which necessitate parent co-operation. Some means must be found to contact parents and still keep the confidence of students.

In many cases it is possible to work directly through the student, emphasizing the justification for parental interest and the importance to youth of consulting and working with their parents. However, co-operative efforts between teachers and parents are also needed so that they can arrive at some common understanding of the adolescent.

General meetings of parents of a particular class or grade group have been found very useful in interpreting adolescent growth problems. Teacher-student-parent discussion of common problems permits the consideration of issues and points of disagreement on an impersonal basis. Many of the difficulties associated with the establishment of independence from the home can be eliminated by examining them in public meeting and disclosing the fact that conflicts of this kind occur in many homes.

There are times when parents can be participants in school programs to the benefit of all concerned. Trips and excursions which student groups may take and which involve the use of family cars will often find students willing to have parents along. Teas for parents, and mothers' and fathers' nights are usually welcomed by students. The school staff can make these an occasion for the strengthening of friendly relations between home and school.

There are many other situations in which parents can participate. Representation on student councils, student activity committees, and curriculum committees will not only foster mutual understanding,

but will assure a sounder program for adolescents. There are many parents who can contribute to the school program from their experience in music, art, science, medicine, or travel. They can make it a richer experience for students and gain personally from this contact with an enthusiastic adolescent group. Students are not likely to resent this impersonal kind of parent participation, once it is established. Also, contacts with adults may then become more natural and less to be feared.

The problem of working with students and helping them to attain more satisfactory family relationships was discussed in the section on class activities. However, instruction of students and work with parents should be a part of the same process. The two are correlative aspects of one responsibility of the school. Usually they cannot be handled separately. The instructional program with students will be more effective if paralleled by efforts to secure understanding and co-operation from parents.

2. Relations with Community Agencies

The family, the church, and numerous welfare and recreational agencies have a vital part to play in the education of youth. Yet they are strangely unrelated in respect to their purposes, methods, and knowledge of the individual. It is a rare community in which all agencies are co-operating—sharing their information on needs, and planning mutually supporting programs. Consequently, tremendous resources are wasted and inefficient, less complete educational programs result.

A few communities have operated through community councils or less formal means to plan and work together. With the development of nursery schools and provisions for the day-care of school children, the trend toward co-operation has been increased. The extension of the school day has often served to bring together agencies which formerly were operating independently, sometimes as active competitors in certain areas. The increase in juvenile delinquency during the war period has emphasized the fact that many adolescents are failing to make adequate adjustments. Concerted action by all persons and agencies concerned is required to cope with this situation.

Some communities, finding both in-school and out-of-school youth spending their evenings on the streets or in undesirable places, have opened community centers for them. In other places the schools have organized year-round or summer camps. The appropriateness of the plan depends on the need and the community situation. A good pro-

gram for adolescents from 9:00 A.M. to 3:00 P.M., five days a week, is often inadequate. One answer to this problem may be in the closer co-operation of schools with other youth-serving agencies.

3. The Use of Community Resources

In recent years there has been a broad extension of the materials and subject matter of the school. The resources of the community have been utilized and service has been given to local groups and activities. Certainly if adolescents are to be guided successfully toward full participation in adult activities, the school must help to bridge the gap between its own and out-of-school activities.

With increasing frequency schools are studying local problems. Surveys involving parent participation become useful learning devices. When problems are uncovered and analyzed, they become the object of co-operative effort toward improvement. Students can make profitable approaches to many problems in areas such as recreation, disease control, soil improvement, beautification, and the prevention of juvenile delinquency. Significant progress toward maturity may be achieved by those youth who are thus aided in working out solutions to the adjustment problems they face during adolescence.

Occupational adjustment is particularly difficult in view of the complexity of our modern power-industrial civilization with its extreme specialization. Few youth have opportunities to gain first-hand contact with any jobs. As noted in chapter xiv, in normal times many begin their first regular employment with little or no work experience of any kind. As a result of such conditions many schools are encouraging work in community industry or business by arranging contacts for students, supervising their work, and giving credit for such work experience toward high-school graduation. This use of community resources fosters general vocational understandings and assists in making vocational adjustments.

VI. RELATIONS WITH ADULTS AS PEERS

The crucial importance of peer relations has been frequently mentioned. In one form or another the idea has been emphasized that nothing is as important in adolescent development as a feeling of personal self-confidence in relations with age-mates of both sexes and with parents and other adults. The quality and character of relationships are significant for mental hygiene and personal-social development. Adolescents become socialized through living with others. The nature of their social behavior depends upon the kinds of rela-

tionships which they experience. In other words, adolescents "learn what they live" with peers and adults.

It is highly important, therefore, that adults recognize that children can make certain important adolescent adjustments only as they have opportunity to live and learn their sex role, to co-operate with others, to carry responsibility, to practice social skills, and to share values and purposes with others. Adults are inclined to regard as time wasted, the countless hours children spend with age-mates, talking, playing, reacting in various "idle" ways. But the indiscriminate experimentation and rough and boisterous play of early adolescence merges into the more serious and mature relations of later adolescence. Characterized as they are by intimate, class-conscious, small-group ties, these associations frequently persist for many years. During this latter period youth acquire a changed attitude toward adults. They are ready for friendship. In the process of becoming adults they no longer fear adult domination and control, but wish to be regarded as equals. Adults who control youth activities have responsibility for the character of these relationships in later adolescence and consequently for the kind of growth which results.

Staff members in a school, as has been so frequently shown, can do much to stimulate appropriate social relationships for students. Aside from what can be done to develop appropriate peer relations, great influences can be exerted through the quality of adult contacts. Friendliness, understanding, and enjoyable associations are of tremendous educational value.

Through their personal relations with students and their leadership in school organizations and faculty relations, principals are in a position to influence strongly the tone of the school. Positive and constructive relations with adolescents which stimulate growth can be substituted for repressive, disciplinary action. Many opportunities can be opened for wholesome associations among students, teachers, and adults from the community. Through proper faculty relations, principals can foster a sense of enthusiasm and security on the part of faculty members which will inevitably reach students (cf. chapter xv).

Teachers have numerous opportunities to listen sympathetically to adolescents' explanations of their problems, to show confidence in an individual's ability to solve his personal problems, and to facilitate desirable contacts among students. They should be sensitive to the thinking of adolescents who are unready for adult standards. These youth prize the respect of their peers. They dislike public praise,

especially on academic matters. They are not firmly established in social relations and can be inhibited and stifled by the pressures of grades and examinations which so often and yet so needlessly dominate classrooms.

Most schools have given inadequate consideration to developing adolescent competence in dealing with adults. A very small proportion of students leaving the secondary school can meet adults with poise and ease. Naturally these graduates are handicapped in social, civic, and vocational relations. Schools can advantageously bring adults into their program as the maturity level of students will permit. Suggestions for doing this were given earlier. Contacts with adults can be fostered outside the school in the effort to facilitate a transition to adult activities.

Occasionally schools encourage parents to come into shops and laboratories. The free give-and-take which is possible in this atmosphere—the opportunity to work side by side, gives youth new confidence and new understandings. Planning and conducting community surveys; providing recreational nights at the school; planning and conducting summer, community recreation programs; working out solutions to community problems such as bicycle regulations, disease control, community beautification, or juvenile delinquency are but suggestions of the numerous possibilities. Wise professional leadership in bringing adults and adolescents together is, of course, necessary. Adults need a sympathetic understanding as well as a full respect for each boy and girl. Some communities have found that youth in and out of school spend leisure time on the streets or in undesirable places. Community centers have been opened for them with some overlapping, where desirable, between youth and adult programs.

Youth can be given wide experience with adults through all phases of the regular program as well as through activities especially arranged for this purpose. Youth can learn to be adults through living and working with adults.

REFERENCES

1. BLOS, P. *The Adolescent Personality*. New York: D. Appleton-Century Co., 1941. Pp. 517.
2. BROWN, M. "The Guidance and Health Programs at University High School and Claremont Junior High School," *University High School Journal*, XIX (1941), 79-111.
3. BROWN, M.; MARTIN, V.; and OTHERS. "The University High School Study of Adolescents: Characteristics of High-School Students," *University High School Journal*, XIX (1941), 177-219.

4. BURNHAM, H. A.; JONES, E. G.; and REDFORD, H. D. *Boy and His Daily Living*. New York: J. B. Lippincott Co., 1935.
5. CAMERON, W. J. "A Study of Social Development in Adolescence." Berkeley, California: Institute of Child Welfare, University of California (mimeographed). Pp. 25.
6. COMMISSION ON SECONDARY SCHOOL CURRICULUM OF THE PROGRESSIVE EDUCATION ASSOCIATION. *Science in General Education*. New York: D. Appleton-Century Co., 1938; *Language in General Education*; *Social Studies in General Education*. New York: D. Appleton-Century Co., 1940.
7. FEDDER, R. A. *A Girl Grows Up*. New York: McGraw-Hill Book Co., Inc., 1939. Pp. xix + 235.
8. GRABBE, P., and MURPHY, G. *We Call It Human Nature*. New York: Harper & Bros., 1939. Pp. 120.
9. GROVES, E. R., and BLANCHARD, P. M. *Introduction to Mental Hygiene*. New York: Henry Holt & Co., 1930. Pp. vi + 467.
10. HAVIGHURST, R. J.; PRESCOTT, D. A.; and REDL, F. "Scientific Study of Developing Boys and Girls Has Set Up Guideposts," *General Education in the American High School*, chap. iv. Chicago: Scott, Foresman & Co., 1942.
11. JONES, H. E. "Observational Methods in the Study of Individual Development," *Journal of Consulting Psychology*, IV (1940), 234-38.
12. ———. *Development in Adolescence*. New York: D. Appleton-Century Co., 1943. Pp. 187.
13. KELHER, A. V. *Life and Growth*. New York: D. Appleton-Century Co., 1940. Pp. x + 245.
14. MEEK, L. H., and OTHERS. *The Personal-Social Development of Boys and Girls with Implications for Secondary Education*, pp. 211-17. New York: Committee on Workshops, Progressive Education Association, 1940.
15. MCLEAN, D. *Knowing Yourself and Others*. New York: Henry Holt & Co., 1938. Pp. xix + 275.
16. ROSENBLATT, L. M. *Literature as Exploration*. New York: D. Appleton-Century Co., 1938. Pp. xiii + 340.
17. RUCH, F. L.; MACKENZIE, G. N.; and MCLEAN, M. *People Are Important*. Chicago: Scott, Foresman & Co., 1941. Pp. xii + 283.
18. STERN, B. J. *The Family Past and Present*. New York: D. Appleton-Century Co., 1938. Pp. xiv + 461.
19. UHL, W. L., and POWERS, F. F. *Personal and Social Adjustment*. New York: Macmillan Co., 1938. Pp. xi + 475.
20. WUNSCH, W. R., and ALBERS, E. *Thicker than Water*. New York: D. Appleton-Century Co., 1938. Pp. xvi + 359.
21. ZACHRY, C. B., and LIGHTY, M. *Emotion and Conduct in Adolescence*. New York: D. Appleton-Century Co., 1940. Pp. xv + 563.

CHAPTER XVII

PREPARING YOUTH TO BE ADULTS

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I. THE TASK OF ORIENTATION

Like the god Janus, the adolescent faces two ways. He faces forward. Accompanying his body's rapid, almost headlong growth, are emotional urges toward adulthood quite as resistless, no more to be denied. A being of quickened sensitivity and deepened understanding, the world is opening up before him in a manner at once strange, fearful, and wonderful. It almost seems as though there is a heightening of sense perception, as though he were seeing, hearing, touching for the first time. Meanings once shrouded in mystery are becoming clear. Words formerly unheard or carelessly ignored are charged with deep meaning. To this new world the adolescent makes eager and passionate response. He is endlessly curious. Like Browning's Paracelsus, he would "see, know, touch, taste all." He would grasp the world—all of it, and all at once. The four walls of his home, once so important, seem small indeed. The government of cities, of states, of nations—all concern him deeply. Science, the human body, the stars, machinery are within his ken. Literature, art, and music are taking on a strange new beauty, a new poignancy. Nor is the boy or girl merely the passive spectator, the student of life. He would be the active, the dominant participant. He longs to go forth and right wrongs, cure injustices, make new discoveries, create new beauties. He longs to prove himself physically—to be comely, strong, swift, sure, graceful. He longs to prove himself economically; to find his particular place in industry or the professions; to wear that badge of competence—the possession of a good job, and to advance on that job. He longs to be attractive, even irresistible to the opposite sex; he looks forward to a perfect mating, and to wearing another badge of competence—marriage and the founding of a family.

In his attempt to visualize the future, the adolescent is naturally preoccupied with himself. He feels that the next few years are to be the great proving ground. Now nature is developing and maturing the body he must live with for the rest of his days. Is he going to be a great mammoth of a person? Is he going to be clumsy or small and puny? Will he be ugly, the kind of person others turn away from? Is his nose going to be too long or too short? Are his eyes too small or too close together? And mentally—are these dreams he is dreaming only an old story to his elders, something long since considered and discarded for some reason he stupidly overlooked? Is some germ of failure lurking in all his brave plans for the future? Has he overlooked some vitally important elements?

But if the adolescent looks forward, he looks also backward. In many ways he is helpless to keep pace with his own growth. He is unable even to manage his body, which has become suddenly so tall, broad, and heavy. At the very time when he longs, more than at any other period of his life, to be master of his physical endowment, he goes about falling over his own feet, tripping and breaking things. Nor can he manage his newly acquired mental and emotional powers much better. Strong new sexual urges frighten him; judgment lacks the balance wheel of experience; ignorance makes opinions one-sided; and, though not fully comprehending, he is quite aware of his weaknesses and limitations.

The change in the boy's voice is symbolic of adolescence. In times of stress he slips back into childhood exactly as his voice slips back into the high treble. Starting out boldly to make up his mind, he suddenly falters, turns helplessly to adults for advice as he has turned in the past; and he feels frustrated and inadequate because he has to do so. He wonders if this is all he can expect of himself, if he will be unable to meet the demands of the world as an adult.

II. THE CONFUSION AND STRESS OF ADJUSTMENT TASKS

The unevenness of the adolescent's development adds to his difficulties. Beside an individual who seems to be a man or woman is one of the same age who seems little more than a child. The one who can think and look like a man often cannot act like a man; the one who is sexually mature may be mentally immature. If the adolescent is unsure of himself, the adults around him understand him little better. Often they are guided by physical traits alone, and find it hard to believe that this seeming child has flashes of understanding and of insight which sometimes excel their own. Many times adults give

too much thought to the adolescent's inexperience, too little to the freshness of his viewpoint, and the clarity and impartiality of his judgments. Only too often, it must be admitted, rivalry enters in. For adults, who themselves have ceased to grow, see in this vigorous young person someone who will one day—perhaps tomorrow—put them on the shelf.

Thus adolescence is, under the best of conditions, a period of some conflict and strain. The adolescent is highly sensitive, with a capacity alike for joy and pain such as he may not possess at any other period of life. He is still very close to childhood. Indifference, especially on the part of adults, wounds him deeply; misunderstanding often causes actual suffering; ridicule is agony. Fearing this suffering, he builds his defenses. Perhaps he withdraws from his associates; and he may especially feel the need of withdrawing from his parents, for no other reason than the fact that they are the ones to whom he has always been a helpless child. He fears to slip back into the pattern of dependence, he feels the urge to re-establish himself with his parents and to take his place with them as an adult. And thus he withdraws from all adults who he believes will not understand, will fail to accept him for what he longs to become instead of for what he feels he is. This withdrawal may take the form of reserve. He may trouble his parents, teachers, and guidance counselors by surrounding himself with a shell, by refusing to talk with them about the subjects which are vital to him, and even those which obviously trouble him. Or he may wear a mask of swaggering indifference, and seem to revel in scorning serious concerns; he may even become openly rebellious or defiant. Sometimes the longing to prove himself and the fear of inability to do so cause him to throw himself into one phase of his life, into school work, or into sports, or into social activities, with too great intensity and to the neglect of other phases. Or in the same way his anxiety to count with the opposite sex may make him overflirtatious; or the same attitude may produce the opposite result, and the adolescent may adopt a "don't-care" attitude toward his work, or toward social life. On the whole he tends to be variable, unpredictable, moody, alternating between high exultation about himself and despondency.

As has been said, these problems are likely to be found among adolescents under the best conditions, where schools and homes have allowed full and harmonious development, in a society which we call "normal." Where conditions are not of the best, where homes and schools exert and have exerted undue pressure since early childhood,

in a period of widespread social stress and economic dislocation, it is inevitable that the tasks of youth become aggravated. Problems present in early or late childhood inevitably become more overt and serious with adolescence, for this period is indeed—as the adolescent fears it to be—a proving ground. The child who has been sheltered and overprotected since infancy, who has been the object of his parents' blind adoration, may be helpless, unhappy, and demanding of attention. These traits tend to be overlooked in the nine-, ten-, or eleven-year-old; adults say, "It is only a phase." They can be less easily ignored in a sixteen-year-old, when the resistless urges toward adulthood come into conflict with deeply ingrained patterns of dependence. Neither the sixteen-year-old nor the adults can overlook them. In the same way the child who has felt himself rejected, and hence is insecure, lonely, or afraid, is exposed to more serious difficulty in the period of life when he himself and those about him demand that he stand on his own feet, and when he finds himself helpless before the challenge. In the same way sibling rivalry, attempts by parents to force children into molds of their own making and to the fulfilment of dreams which are not the children's dreams may produce problems which become increasingly serious as the individual approaches the threshold of manhood when it seems, both to him and to his parents, that there is no turning back.

The influence of the school on the adolescent is second in importance only to that of the home. The high school should be a place where he is helped to make this period of his life one of fulfilment, where its challenges become opportunities, its promises are realized. This is the environment in which he should try out his powers and seek the answers to his eager questions about life. The high school should open to him the door into the larger world beyond its walls. He should find his urgent needs met here—the need to be needed, the need to be of real use, to make the world a better place. Above all he should find here understanding. Turning naturally from his parents, but still conscious of the necessity for guidance and help, he seeks these from the staff of the school, and especially from the teacher, his leader and helper in the learning experience, with whom he spends so many hours every day.

III. TASKS IMPOSED BY SOCIAL AND ECONOMIC CHANGE

As conditions today plainly show, the adolescent boy and girl reflect inevitably the broad social conditions which obtain in the com-

munity, state, and nation in which they live. Being the one most subject to conflict of any member of society, the adolescent is asked to bear an especially heavy burden in periods of social stress. Since he is neither adult nor child, society shifts its view of him as the exigencies of the situation demand. If there is a period of financial stringency and jobs are hard to get, society says to the adolescent, "You are a child; you should remain at home and continue with your education." Moreover, the youth is expected to consider himself fortunate to be able to do this. Adults, themselves strained and anxious under severe economic pressure, overlook the serious, often tragic, emotional consequences of this rebuff to youth. For economic dependence means personal dependence as well. Being supported tends to keep the adolescent a child in his parents' house—a child whose opinions do not count, whose judgments are overridden, who is expected to seek and to follow advice. And he is no longer a child. But neither is he grown up enough to comprehend. To him his inability to earn a living and to accept responsibility are a reflection, a sign of inadequacy. He is a failure. If the pressures become too great the adolescent boy, unable to stand the feeling of humiliation and the sense of guilt arising from the unbearable realization that he is a burden on his parents, runs away from home and takes to begging and to riding the freight cars, as we saw him doing in the 1930's. In addition to the personal frustration is the sense of disillusionment. Just at the period when he is passionately looking for equity and justice and beauty in the world, he tends to be overwhelmed by the cruelty, ugliness, and stupidity he finds there. The widespread problems of youth during the last depression were clear evidence of what economic stringency does to adolescence.

IV. THE EXCEPTIONAL TASKS OF WARTIME

In periods of war, like the present, conditions are reversed. Society needs man power. It needs also, to a lesser degree, woman power. It needs certain physical qualities—endurance, speed, strength, agility. It needs qualities of personality—boldness, dash, reckless courage, idealism of a high order. All these qualities adolescence possesses pre-eminently. The farm and factory too, while needing skill, training, and experience, cannot find these, for their men of draft age have joined the armed forces, therefore, they also must turn to the adolescent boy or girl. Thus, the child of the depression becomes the man or woman of war. The eighteen-year-old, if physically fit, dons a uniform and goes out to fight. His sister and his younger

brothers find industry and agriculture beckoning to them, inviting them to leave school, offering them alluring rewards—positions of considerable responsibility and high wages. And the status of the adolescent at home changes correspondingly. The boy or girl who sits about at home or still carries school books is looked upon quite differently from the one who is out fighting for his country or adding materially to the family income. Said a boy not long ago, "My father didn't use to listen to me, but he listens to me now." This rapid fluctuation of the position of the adolescent was well expressed by a group of boys recently. "We used to say, 'W.P.A. here we come.'" they remarked. "Now the world is saying, 'What are you waiting for!'"

How does the adolescent react to this situation? Can he rise to the demands being made upon him? Can he become a man because the world expects it of him? To some extent he can. And there can be no doubt that the second state is better than the first. War does meet one basic, urgent need—the boy's need to be needed, the need to count in the world, to assert himself as a man among men, to express in action his irrepressible will to serve. For many adolescents there is a narrowing of interests—a channeling of emotions into one burning feeling of patriotism which is symbolized by the desire to help their country in its crisis, to fight for it, to work for it, to keep it going. The unparalleled courage being displayed by our boys on the front, the enlistment of girls in the Waves, Wacs, Spars and Marines, the war work and farm work being done by our high-school boys and girls are proof of this statement. But this by no means gives the entire picture of the effect of war upon adolescence. Like depression, war takes its toll of the members of this age group. Plenty of our boys and girls have the stamina to go through this war, but few of them can go through it wholly unscathed. In 1918 the men went to the front singing, with flags waving and drums beating. This time it is different. This is not a "singing war." Our boys are grim. They are, if courageous, quite clear-eyed. A high-school graduating class opened their last yearbook with these words: "We are not the usual group of high-school Seniors—confident and eager, comparing colleges, and deeply concerned over what to wear on May 29. We've seen Czecho-Slovakia fall, Poland and France. Now we see service flags with, here and there, a gold star. Some of the boys have Navy cards. Many of us are not going to college. Restless, unsure, and a little bit scared, we face a difficult and uncertain future." There would seem little doubt that the graduates of this class will do their part. Nor can there be any doubt as to what it means to them to have seen

the effects of ruthless aggression, what it means to them to give up their cherished plans for the future, for college, or for vocational school, or for jobs—for a happy, carefree social life—the chance to be young a while longer. “Restless, unsure, and a little bit scared. . . .” Other boys and girls, less mature, subjected to stronger pressures at home and in school, will be less able to rise to what is expected of them. Responsibility finds them unprepared. Maturity cannot be forced—not by a year, not even by a week.

Nor can we overlook a special group of adolescent boys—those who fear or know they will be rejected by the draft. We have explained what physical competence means to the adolescent, and it means far more to the boy than to the girl. Tradition has tended to ingrain in him the belief that his body is the outward symbol of his entire self—that physical weakness is a reflection on his manhood—hence rejection by the Selective Service is clear proof before all his friends and before the world that he cannot measure up. And pre-flight training and other courses in our high schools have a similar effect on the younger adolescent. They apply, only to find—perhaps after they have completed the course—that they will be unable to take further training, that they will never fly. The bitter discouragement and frustration these boys are facing is a fact that society must take very seriously.

It must be remembered too that the girl is far less favorably placed in relation to war than the boy. Her longing to help her country is just as great as his, her zeal for sacrifice as intense. But she cannot offer herself as he can—she cannot fight; nor does she have the physical strength to help her country in other ways as he can. It is true that in this war she has the opportunity to join various branches of the armed forces—the Wacs, the Waves, the Marines, and the Spars, but she cannot join these corps until she is twenty years of age. Although girls mature emotionally earlier than boys, the boy goes into uniform at eighteen. Two years are a very long time when one is eighteen. To many girls this difference of treatment seems like a reflection on them; it seems unfair. Thus, numbers of our young girls today are suffering from a continual sense of frustration in relation to the war. Also it is important to bear in mind the effect on girls of the boys’ departure for the front. Again the girls of this war are more clear-eyed than were those of the last. They realize perfectly well that the boys may never come back. And if they do come back, they may nevertheless still be lost to them, for it will be as strangers. “Suppose my boy friend does return?” said a girl re-

cently. "I won't have anything to give him. He'll have seen and done so much. . . . He'll have outgrown me." Those who have come into close contact with numbers of adolescent girls know that many of them are quite soberly accepting the fact that they must go through life without personal fulfilment—without having homes and children of their own. This realization may place them in a frame of mind to grasp at whatever fleeting satisfaction comes along.¹

Nor are our adolescents by any means ready for the economic positions which are open to them. For boys or girls in their teens to be earning, as many of them are, from twenty-five to fifty or even eighty dollars a week, is not always desirable. We shake our heads when these young people go into department stores and spend hundreds of dollars on clothes, but forget that they would not be doing so had adults taught them how to use their money more wisely. And equally serious are the effects on personality. Finding everyone bidding for their services presents another set of problems. To inflate the value of human service is just as serious as to inflate the value of the dollar. Many—of course not all—of these young people assume they are men and women because they are earning a man's or a woman's wage. They tend to take the reins of their lives into their own hands; they will brook no interference; and yet they still stand in need of advice and guidance.

To this situation the general atmosphere of the country and the various social dislocations attendant upon the war inevitably add. At the very time when adolescents most need their parents, when they need parental companionship and help, they have the least chance to obtain these. Fathers are fighting, many mothers are working, either in defense plants or in volunteer war work, leaving their boys and girls for long hours to their own devices. Many families have pulled up stakes and moved across the country, and the necessity for adjusting to new and strange surroundings adds to the adolescent's problems.

It is these conditions which are responsible for the present emotional problems found among our youth today, problems which are proving alarming to many of our teachers, guidance counselors, and to the public generally. Reports from schools and other sources indicate clearly that restlessness, turbulence, and emotional instability are increasing among adolescents everywhere. There are evidences also of increasing hostility toward adult authority, of insolence, and

¹ We should remember too, the effect of hasty marriages on adolescents, who tend to imitate the next older group.

even of open defiance. Many young people, especially boys, are becoming increasingly careless and indifferent toward their school work; the number of boys and girls who are summarily dropping their studies and going to work is disturbing educational authorities. As this is written, registrations in our high schools are becoming alarmingly low.

It is believed, and figures from various parts of the country have been cited to prove the fact, that juvenile delinquency is increasing among adolescents—particularly that sex offenses are increasing among adolescent girls. As indicated in an earlier statement by the writer² many who work with emotionally disturbed adolescents deplore this emphasis on delinquency. We deplore even the use of the term. In the first place, figures as to the extent of delinquency have little real meaning. Whether or not an adolescent is arraigned before our courts depends upon the attitude taken by the schools, the police, and the social agencies of the community in which he lives. And after he has appeared, whether he is classified as “delinquent” or “neglected” depends on the judgment of the court. But there are even more serious grounds for avoiding the use of the word. To isolate certain forms of emotional disturbance and to label them with a term of opprobrium is both scientifically inaccurate and inimical to the interests of youth. It presupposes an attitude of sitting in moral judgment, of attaching blame for behavior which should be considered as a symptom of disturbance. It also assumes that behavior of a certain type is always more injurious to society than other forms of behavior also resulting from undue emotional pressures. And this is not the case. We all know that the boy or girl who may never appear before any court may be a greater potential social menace than the one who does. Moreover, an act of aggression sometimes results from the feeling that the world is hostile toward the aggressor. However understandingly our boys and girls may be handled in the courts, to place the badge “delinquent” upon them at the age when they are most sensitive, most easily wounded, only confirms them in their belief, and consequently tends to intensify the impulse toward aggression.

V. RESPONSIBILITIES OF THE HOME AND THE SCHOOL

The point which should be emphasized then, is not that of the possible increase of juvenile delinquency throughout the country; it is rather the clear-cut and tangible evidences of the emotional strain to

²“The Challenge of Our Restless Youth,” *New York Times*, May 2, 1943.

which our young people are being subjected today, and the consequent increase in behavior problems among them. Furthermore, it should be continually borne in mind that the war is not wholly responsible for this condition. The inevitable conflicts attendant upon the process of growing up are partially responsible. And a great deal of the responsibility rests with many of our homes and with most of our schools, where undue emotional pressures have been exerted on the young, in numerous instances since earliest childhood. The war has only aggravated and made overt a situation which has been with us for years. Indeed, we may have little doubt that, difficult as this period is, our adolescents would be able to weather it, had they from birth found themselves in an environment at home and in school where personality thrives, where it develops fully and harmoniously, where it becomes strong. And now, not having given them this environment, we blame youth. We say, "Our boys and girls have no respect for law and order. Our boys and girls are headstrong; they are irresponsible; they are lazy; they are avid for money; they have no sense of values; no self-control."

We cannot help our restless and disturbed young people until we recognize our own responsibility in regard to them, and accept the fact that it is we who have failed them, not they who have failed us. Then and then only can we take measures to meet their needs. Our schools must accept this challenge of youth. Members of the school staff must also find ways to help parents improve conditions in the home. And they must play a part in improving community life as it relates to growing boys and girls. Among individuals and groups who are accepting responsibility in regard to adolescence today are the advocates of repressive discipline. These are the ones who are advising schools to demand unquestioned obedience, and to enforce their demand by severe punitive measures, even by corporal punishment. Parents are counseled to make the boys and girls know who is the head of the house, to "keep them down," to be more strict, to "stand for no nonsense." It is urged that communities follow the same plan—that parks and places of amusement be closed, curfew laws instituted, and the rest of it.

It is true that repressive discipline does achieve some temporary results. If the measures are strong enough, the boy or girl may be compelled, through pain, or fear, or ridicule, or deprivation to conform outwardly while authority is present. He can be made to "walk the chalk," certainly. But no one can compel him to "walk the chalk" in his mind. No one can prevent him from harboring bitter grudges against those he feels have made him suffer for no reason he can understand. Since he

has been taught to obey and not to think or act for himself, he will, when authority is removed, tend, if aggressive, to commit acts of retaliation; if docile, to follow blindly those who do. This procedure is unwise at any time; it is doubly so now.

The only possible way to meet the problem of youth is to face their difficulties realistically, and to provide them, so far as possible, with an environment suited to growth needs. Homes must provide them with that kind of environment. Through informal interviews guidance counselors and teachers must help parents to realize that, though busy, anxious, and overburdened themselves, the needs of their children demand more of their time and thought than they are giving. Not through categorical statements, but through frank and sympathetic interchange parents need to gain added insight into the growth process as such, into the demands which the war is making on adolescence, and into the particular problems of their own children. And they should be skilfully assisted to find their own ways of improving conditions in the home. Only then can they take the needed steps. Then they will be able to accept the adolescent's seeming withdrawal from them, not as a real withdrawal, but as a normal evidence that he is becoming a man. Moreover, they will not seek to cling to him, for they will be sure that if their child is leaving them, an adult who will be even closer to them is taking his place. Accepting the adolescent's new responsibilities outside of the home, they will see that he has a corresponding status within it. They will not "give him his head" certainly, but will offer him a place at the council table, will consider his judgments seriously, in a home where democracy is really practiced.

Parents who have been helped to gain this insight will also be fully aware of the adolescent's urgent need for guidance at the present time and will realize that if they are genuinely interested in what interests him, if they show him the sympathy they feel, he will naturally seek their guidance when he needs it. They will be tolerant with his moodiness and his inconsistencies, will understand and not ridicule such superficialities of behavior as preoccupation with grooming or with bizarre attire. They will guard too, against the very natural tendency to overindulge the boy who is soon to be risking his life at the front, for they will realize that overindulgence will not really make him happy. Finally these parents will search themselves, will try to see wherein they are unconsciously expecting something from the adolescent which he is helpless to give—a satisfaction they can only gain as they also achieve greater maturity.

VI. ADAPTING THE SCHOOL TO ADOLESCENT NEEDS

Drastic and far-reaching changes must be made in many of our high schools before they can become places where young people truly "belong," not institutions they perfunctorily "attend." In such a high school the adolescent finds the teachers to be no formal "preceptors," but understanding, sympathetic, responsive human beings, human beings who are interested in him as an individual, to whom his concerns are important. He finds himself in classes small enough so that he counts as a person, not merely as a cog in a great machine. In the early days he is invited to participate in free, spontaneous discussions. These discussions are real and vital; they concern subjects which interest the student—affairs going on in the world, questions to which he seeks the answers. Feeling no undue pressure to respond, the adolescent nevertheless finds himself responding; he opens up, he gives expression to his thoughts and feelings. Through further discussions the interests of the group become more and more clearly articulated; certain subjects stand out as being of concern to all of them. And it becomes apparent that the course of study is to center about these subjects; that it is not to be a rigidly prescribed "program," but something dynamic, growing, moving onward with their developing interests, like the roadway some eager adventurer is following. He studies the past, but the past is not something disinterred; it is living because it illuminates the present and the future. He does not find separate "subjects," but realms of knowledge which blend, which play into each other, and begin to form a unified pattern of human life. This unifying of knowledge is suited to the adolescent's preoccupation with wide horizons, his impatience with limiting himself to segments of human knowledge.

The road the pupil follows leads outward into his community. He finds out about the way the community is governed, he learns things about the entire population, not merely about the circle in which he moves—about where and how the people live, about their houses, and what they do, and how they work and play. He becomes acquainted with what public and private groups are doing to better conditions, to provide play opportunities for children, as well as hospitals, parks, and other needed facilities. He also learns what remains to be done. The state and the nation concern him; he studies more deeply the causes of this war, the meaning of our way of life and why we are defending it, how the war is being prosecuted and what the government expects of its citizens. Students who apply for preflight or similar training courses are carefully tested before being accepted. If refused, they

are shown other ways of serving their country, and it is carefully made clear to them that these ways are quite as important as the one they have chosen.

The adolescent's need, not only to acquire knowledge but also to act in relation to knowledge, is also satisfied in this kind of high school. There are various enterprises in which the class engages, not as an aggregate, but working in various groups, each of which does its part to contribute to the whole. Tests of intelligence and of achievement make it possible for the teacher to help plan the work of these groups in the light of the aptitudes and interests of the individual students. Through these enterprises learning becomes a real experience in democratic living. In some instances this experience represents an actual service to the community in the form of a study of its needs, or of concrete assistance in getting these needs met. Thus, the pupils may, for example, help to secure a new playground, a community center, or improved housing. Again, needed war work may be undertaken, and to such services as the sale of War Savings Stamps or the collection of scrap may be added work like making of model airplanes for the War Department, the construction of toys by manual training classes, or giving needed aid in day care centers for young children.

When the program of the secondary schools becomes generally molded to this pattern, the typical American high school will be more than a school. It will belong to the students as a place in which to play as well as to work. They will assemble in the late afternoons and evenings and follow their hobbies, hold their dances, and do many things together which interest them. Recreation will be planned with direct reference to the needs of the pupils; consequently they will not find it necessary to turn to unwholesome forms of amusement.

It need hardly be said that the guidance point of view, which is the mental hygiene point of view, will pervade the entire school. The general atmosphere—not only of classrooms, but of corridors, offices, and gymnasiums—will be warm, relaxed, friendly. The teachers will take account of the emotional needs of each student in relation to learning. Thus, they will know when there is resistance to particular subjects due to attitudes or pressures at home and will not try to stimulate interest artificially, but will know how to approach the subject through channels of genuine interest. The teachers will know how to build security where it is lacking and will offer to each pupil the chance to make his place. The guidance counselors will have ample time to give more intensive service to those who need it and to keep other members of the school staff informed about the problems these pupils are facing.

Those adolescents on whom emotional pressures have been so great that they present deep-seated and serious emotional problems will receive the special assistance they need. As the emotional pressures become lessened, these adolescents will be able to relieve their overburdened minds, to talk frankly, and to release their pent-up energies through appropriate outlets in constructive activities. Gradually they will gain insight into their most perplexing problems and difficulties; and finally they will be able to make the appropriate adjustments for successful entry upon the plane of adult living.

VII. THE IMMEDIATE CHALLENGE TO EDUCATION

The tendency of boys and girls to leave school for work has created a problem which needs special consideration at the present time. We cannot oppose the adolescent's urge to go to work and earn money—especially now when such good positions are open to him, and when industry and agriculture are making an appeal for his services, emphasizing the relation of such productive service to his patriotism. Moreover, work experience is extremely valuable for boys and girls. On the other hand, we cannot accept the fact of large numbers of young people suddenly dropping their education without making any plans whatever to minimize the losses this fact entails. Such a procedure would be utterly contrary to our democratic principles, and would result in a human waste society cannot afford. Careful plans for meeting the situation should be made by the various states and should, of course, be suited to the different localities. In general these plans should effect a compromise whereby the country is given its needed manpower and the interests of youth are safeguarded at the same time. In the first place, the procedure for securing work permits should be such as to encourage the boy or girl to consider very carefully the probable results of dropping his education and going to work. This could be done through requiring that a statement of intention be filed ten days or two weeks ahead of time, and through decentralization of administrative procedures in large cities. In the second place, the boys and girls should be given the chance both to work and go to school. Those who have not graduated from high school should be enabled to work for a certain number of hours a week while continuing in school. It might be well that all those under sixteen should be allowed to work only on such a plan of released school time. Third, communities should provide facilities for evening schools and for extension opportunities. And finally, adolescents who have left school for work should not be dropped by the educational authorities, for they stand in special need

of assistance and advice in relation to further schooling and vocational plans. For these pupils a special service through correspondence, individual visits, and conferences with special counselors should be provided.

These are some of the measures in home, school, and community which will meet the present pressing problems of our adolescents. As has been indicated, these have always been regarded as essential, for the needs of young people do not change no matter how much conditions around them change. And the future is quite as important as the past. The task of rebuilding after the war will make far greater demands than has the war itself. Those who have been emotionally warped by the pressures of war, whose growth has been stunted, who are accustomed to obey but not to think and to act for themselves, are irresolute, hostile, or afraid, will not be equal to the task, for it will call for all they have of courage, boldness, assurance, self-discipline, tolerance, understanding, the will to subordinate self to the needs of the social group. And while some of us who are adults will participate in the work, the major burden will fall on those who are now in their teens. We have left them this heritage. We cannot change it now. But we can and we must prepare them for what lies ahead. Youth will respond; they have always responded. They ask, after all, for two very simple things—understanding and respect for their personality. They ask that adults appreciate their long and occasionally foolish dreams, their sensitiveness, their sometimes ridiculous, sometimes piteous defenses, their strange inconsistencies, their alternation between hope and despair, between independence and helplessness. They ask that adults appreciate these and find them neither foolish nor ridiculous nor piteous nor strange nor inconsistent, but simply a part of human growth and, as such, pregnant with deep meaning, possessed of dignity and grace.

SECTION V
THE CONTRIBUTION OF THIS YEARBOOK TO THE
LITERATURE ON ADOLESCENCE

CHAPTER XVIII
AN EVALUATION OF THE YEARBOOK

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L. K. Frank modestly says in the introduction, "We have considerable knowledge of the biological process and some understanding of the social growth of the individual which we can and should utilize in our homes, schools and community programs." The Forty-third Yearbook, Part I, gives testimony to Frank's thesis. Childhood is long and of infinite complexity; adult social forms impinging upon it serve only to multiply the universal problems of growth, learning, and adjustment.

While the Yearbook committee would be the last group to maintain that new discoveries reside in this volume, its chairman deserves full praise for the balanced views presented in a field of study which has long been the happy hunting ground of sentimentalists and fanatics. G. Stanley Hall knew that adolescence was important, and he knew why, but most of his followers were tainted with a sense of vicarious sin. They wallowed in subsistence and sermons; the adolescent veered from evil to saintliness, without enough good, rational, explorable territory in between.

As scientists, the authors proceed cautiously—and with reasonable restraint, as social observers. The result is sometimes meager, but it is never preposterous. Their scientific method is the best available, but it is not as yet good enough. The next approach to adolescent development will be less statistical and comparative; it will become experi-

mental. Revealing a prejudice, I shall express the opinion that, for a long time, we shall not need another yearbook based on the present type of material. It will be better to wait until new methods of analysis (physiological, mental, emotional, and social) have been perfected.

But the volume is steeped in personal and clinical wisdom. If teachers and parents generally knew what some of these authors know and clearly express, we should enter upon a better life—the victory on the home front, that is, over the forces of frustration and personal impoverishment, would be assured.

All but the technically minded may skip the scientific chapters. If they read only the others, they will be amply rewarded. If they will, in addition, perform two tasks, they will be on the highroad to full understanding. The one is to build up their private understanding of the adolescent personality, enriching the accounts here presented through their own selection of revealing experiences. The other is to turn toward art—to exploit the poem, the novel, and the drama. It takes everything, from graphics and statistics to the sound dramatic touch, to bring to life the meaning and the glory of human growth.

The goal is worth struggling toward because it is the same for all persons and all ages. To understand the adolescent, is to understand everybody. Man craves security and affection, and he wants to live and grow. At heart, man is forever young.

To avoid further generalization and to get in phase, as it were, with the actual text, I shall utilize the chapter titles as headings for more explicit evaluations.

I. PHYSICAL CHANGES IN ADOLESCENCE

While adolescence is generally thought of as a period near the beginning of physical maturity, it is equally true that it is near the end, as physical man, on the average, maintains his peak of condition only a few years beyond the age of twenty.

Greulich's chapter shows the complex character of the problem of heredity, even in the relatively simple factor of standing height. He holds that the genetic constitution of man determines the end product of development "within rather narrow limits." Subsequently four growth factors are mentioned: health, nutrition, pituitary hormones, and the gonads, the glands acting reciprocally. Thus, an early production of ovarian or testicular hormones arrests growth, while undue delay may lead to abnormal height. If we may assume that environmental conditions affect glandular activity, what is *genetic* in the final outcome is obscure. For example, if a good diet and favorable environ-

ment tend to hasten the onset of puberty, this should result in shorter children, the sex hormones gaining over the pituitary (growth) hormones. Is the increased height of American children unrelated, or negatively related, to good diet and good health?

In menstrual cycles, irregularity appears to be the rule, especially in young girls. While the menarche is a poor criterion of true sexual maturity, its significance as a determiner of personal upsets and social taboos should not be underestimated.

II. ADOLESCENT CHANGES IN BODY BUILD

The desire to establish "types" by focusing attention upon the extremes of a distribution is a major human weakness; it fills a need for a personalized description without the bother of statistics. In anthropometry the trend is toward placing the individual properly with respect to averages and deviations in various measurements. While Bayley and Tuddenham point this out, they expect great things of Sheldon's typing schema. That Sheldon, like Kretschmer before him, may compound difficulties has been brought out in the writings of H. V. Meredith. When subgroups are added to seventy-six basic groups, the question is, why have groups at all? Similarly, there seems to be no point in mentioning Sheldon's work, unclear in its outcomes, on two hundred men over seventeen years of age.

In general, it may be said that a correlation between physique in adolescence and intelligence or temperament, has not been established; values in any one of these three categories are self-sustained.

III. PHYSIOLOGICAL CHANGES IN ADOLESCENCE

Shock regards adolescence "as a period of physiological 'learning'." During this time the organism forms habits useful to its development and regulation. The outstanding characteristic is *difference* in the appearance and rate of growth of new functions—a phenomenon which every parent, teacher and adolescent should understand in order to reduce anxiety. Since studies of the degree of physical exercise which adolescents may endure without harm are restricted by methodological difficulties, it appears best at present to depend upon the individual observations of physicians. Shock emphasizes the complex pattern of the taboos which have developed in relation to the hormone-aroused sexual interests of adolescents. His chapter is distinguished by its balanced treatment of a subject only lately brought within the limits of experimental control.

IV. ADOLESCENT PROBLEMS RELATED TO SOMATIC VARIATIONS

The rapid growth in sex organs during adolescence emphasizes the point that this is the "period when *children* are becoming *men* and *women*." At this time the body is a symbol of the self, as the Stolzes express it; we could go further and say that physical structure remains a permanent factor in personal growth and social relationships. The fundamental adolescent drive is to be acceptable to like-age companions of both sexes. The Stolzes offer a readable chapter which should be helpful for all who would guide and encourage the young. In fact, if they would now delve into their California records in order to reveal in detail the sources of inner strength among adolescents, removing or reducing feelings of inferiority, parents and teachers would be heavily in their debt.

V. THE DEVELOPMENT OF PHYSICAL ABILITIES

During late adolescence most physical abilities show a rapid growth, although there is some indication that performances demanding dexterity will show a slight decline. The trends are so mixed that only by the observation of individual children will the absolute and relative capacities be revealed. Throughout the teen age, boys are likely to be judged for popularity in terms of strength and physical skill. This indicates that school authorities should explore all kinds of recreational outlets for pupils, seeking a suitable means for developing physical and social talent. Practically every boy and girl would benefit from group physical activities.

VI. THE DEVELOPMENT OF FINE MOTOR AND MECHANICAL ABILITIES

In the fine motor abilities depending upon speed, strength, reaction time, precision, and eye-hand co-ordination, the boys tend to be superior to the girls, with individual variations within each sex. The specific nature of motor skills is a complicating factor. The criterion of an appropriate starting time for the learning of a skill derives from *individual observation*. Perhaps the best way to develop mechanical skills among children is to set a good example in terms of adult interest and the availability of tools and workshops.

The authors' concept of human engineering, stressing the importance of methods of work, is of general psychological interest; it should be followed into the more abstract realms of behavior. Inherited limits always operate, but they become clear only under conditions of optimum training.

This chapter is of special interest during wartime and postwar periods, for we need to become explicit about aptitudes and to establish occupational goals in terms of a refined analysis of the skills indicated. Given a strong motivation, the human organism appears widely adaptable to the physical and motor skills demanded. Transfer of training is not implicit, but it can be enhanced by proper teaching methods.

While the authors incline to a strong cultural factor in explaining the greater interests of boys over girls in mechanical matters (machine shop, mechanical toys, electricity, engines, and inventions), there is, as yet, no real evidence for this; the culture may relate itself to the underlying organic differences. As they point out, now is the time to test sex differences in basic mechanical abilities and interests, for women and men are working side by side.

School people should note especially the role of motor skill in developing artistic interests and recreations.

VII. MENTAL DEVELOPMENT IN ADOLESCENCE

While the evidence is not plentiful, we may hold that mental development, as measured by the Thorndike, Army Alpha, or Binet type of tests, proceeds throughout adolescence and presumably for some years beyond this period. With test materials of higher "top" in their abstract demands, one might discover substantial gains. The chapter on general mental development is seen to depend chiefly on fragmentary or peripheral studies, with questions of the validity of the tests employed at ages fourteen or above obscuring the whole picture.

VIII. DIFFERENTIAL MENTAL GROWTH

The proper amount of education for the dull, the average, and the bright cannot be derived from mental measurements alone. Presumably the dull, after a season of *appropriate* education, are less dull than they would have been—for that matter, who is not? But decelerating returns will set in for all, so far as formal preparatory work is concerned; nobody needs to be educated right up to his later decades. At present education, public or private, for either sex, is so far below its potentialities as revealed in the top 1 per cent of our schools, that we may safely advocate some kind of schooling for almost every child throughout the teen ages. Sex differences may be safely ignored, provided individual guidance is available; variability in general scholastic aptitude, at the lower levels of abstraction, is not sex-linked. The authors properly recommend mental records that are cumulative and analytical.

IX. THE ADOLESCENT IN TECHNOLOGICAL SOCIETY

Edwards holds that the trend toward smaller families will continue and that this will result in a higher valuation of the young. A declining nation will cherish its one check upon deterioration; it will have more wealth to devote to the smaller population. Without accepting this view, we may agree nevertheless that the nation, thus far, has *undervalued* its youth population. The young are more than consumers—they are producers of the most precious wealth in terms of vitality, new ideas, and original art forms; they are invaluable, we have discovered, as workers and fighters.

This chapter should be read by all. It is a revealing and stimulating account of some major problems confronting the postwar world.

X. SOCIALIZATION AND ADOLESCENT PERSONALITY

This chapter is a "must" item for all persons who wonder why adolescent behavior is related to the problems of delinquency and pathology, especially at the lower economic levels. The world of adolescence itself revolves about a greater sphere within which the forces of custom, family life, neighborhood, race, and religion assume a measure of control. The Allison Davis account of the meaning of *anxiety* is an admirable piece in itself.

XI. THE ADOLESCENT PEER CULTURE

This chapter centers in case studies; it is easy reading—in part a repetition of some of the earlier writing in the volume. But this chapter, like the two which precede it, would constitute a valuable guidance bulletin for all who are concerned with youth problems. The "peer group" may be a few companions, a gang, or a social clique; Tryon, with evidence to back her views, states that "next to the family in childhood, and probably equally with the family during adolescence," the peer group provides the means for achieving personal security.

Students seeking an experimental analysis of the forces at work within adolescent social groups should turn to the studies of Kurt Lewin and his associates.

XII. THE ADOLESCENT AND THE FAMILY

A plea for sex education above the level of physiology and abnormality is Frank's first cry-in-the-wilderness. Certainly "the facts of life" should be absorbed long before pubescence, while the experiences of social companionship, love, and adulthood will extend far beyond it.

This chapter is a good catalytic agent for securing reactions among parents and teachers; in fact, if a few vocal, uninhibited adolescents were to join in, the effect would be fine for all concerned. The child-growing-into-an-adult needs help, friendship, and understanding. Perhaps the big problem of youth is how to educate older persons, particularly parents.

XIII. THE DEVELOPMENT OF INTERESTS IN VOCATIONS

Over the years, the vocational interests of adolescents have not received serious scientific attention, nor have they yielded much in terms of a general clinical analysis. A few interest blanks are available and, to a limited extent, helpful. Aptitude, family expectations, economic conditions, local opportunities, and national affairs—all these condition such interests; they combine to discourage the averaging technique. The need for expert and long-continued guidance is clearly established.

XIV. IMPLICATIONS FOR EDUCATIONAL ADMINISTRATION

Corey points out certain similarities between the education of adolescent youth and the problems of improving the professional behavior of teachers and school administrators. The teacher's success is vicarious; she grows in social value as her pupils move toward optimum self-realization. Adolescents, like younger children, spend much of their lives in school; if anything goes wrong there, the effects are transmitted through a whole chain of relationships. Corey asks some questions which may be hard to answer, but they would look good tacked on the door of the high-school principal's office.

XV. IMPLICATIONS FOR TEACHERS AND COUNSELORS

While Mackenzie lists the functions and opportunities of counselors, it is clear that most counselors would themselves be conversant with this material—otherwise we should question their competence. But the text is of significance for board members and school executives who may be weighing the value of expert counseling service. Let them be reassured: the behavior problems of the adolescent are related to success in the core curriculum. Failure tends to be inclusive.

On reading Mackenzie, we must be careful not to relate his expectation for the home or the classroom exclusively to the physical or social phenomena of adolescence; they apply, in some degree, to all stages of childhood. Freedom from family domination, for example, is a classic need of the preschool child—any marked failure to achieve it

will show up in rebellious or withdrawing behavior. The youthful person fights for a similar basic satisfaction in terms of more mature situations.

Mackenzie's chapter contains practical suggestions for parents and teachers who want to know *how* the drives of children may be pointed toward desirable goals, without too much violence being done to democratic principles. Its theoretical portions have been fairly well covered in previous chapters. Teachers not too sympathetic anyway to the companionship of youth may resist its hortative paragraphs.

XVI. PREPARING YOUTH TO BE ADULTS

Caroline Zachry's chapter is a kind of footnote to the discussions of Frank, Davis, Tryon, and Mackenzie; it serves to get the post-adolescent into the war. Why boys leave school and why they go toward delinquency are touched upon, and the one great need of every adolescent—of every person—is stressed: to be understood and respected. Zachry could have said more, but her place at the end of the line exacted the usual penalty of a diminishing return.

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